PROTEC®
medical systems

English

OPTIMAX® 2010

Film Processor

Operation Manual

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Machine No.:	
Type:	
Installation Date:	
Status:	08-2009/1.7
Subject to change	

EU-Declaration of Conformity

PROTEC® declares, that the product

Description:	OPTIMAX®2010
Machine type:	X-Ray-Film Processor
Model no.	116x-y-0000 x is a number between ›0‹ and 9, y is a number between 1 and 9

conforms to the following harmonized standards:

Safety:	IEC 61010-1:2001 + A1:92 + A2:95; DIN 1988 T4:12/1988; UL 3101-1; CSA 22.2-1010-1
EMC:	EN 50081 Part 1, 03/1993; EN 50082 Part 1, 03/1993

according to the regulations of:

- the Medical Device Directive 93/42/EEC “Class 1”,
- the Low Voltage Directive 73/23/EEC and the
- EMC Directive 89/336/EG

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Supplementary guidelines:

- DIMDI: DE / 0000042967
- WEEE: DE 55471807

Location and date of issue
Oberstenfeld, 2. July 2007, Jochen Krupp (Technical Manager Analogue Systems)

CERTIFICATE

DQS GmbH
Deutsche Gesellschaft zur Zertifizierung von Managementsystemen

hereby certifies that the company

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for the scope

Design, production and sales of film processors, chemical mixers and accessories.
Design, production and sales of image processing, communication and archiving systems.
Design, production and sales of image detection and read-out systems.

has implemented and maintains a

Quality Management System.

An audit, documented in a report, has verified that this quality management system fulfills the requirements of the following standard:

DIN EN ISO 9001 : 2000
December 2000 edition

This certificate is valid until 2012-02-22
Certificate Registration No. 375503 QM
Frankfurt am Main 2007-02-23

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English

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Information on Liability

This manual has been checked for correctness. The instructions and specifications were correct at the time it was published. Future models may have modifications without prior notice.
PROTEC® does not take responsibility for damage caused directly or indirectly by error, omission or non-conformity of the manual.

Introduction

You are the proud owner of a modern, automatic processor. Due to the precision roller transport system, both sheet and roll films can be processed. The automatic film registration is activated immediately when a film is fed in. The film materials are developed, fixed, rinsed and dried. With the easy to operate micro-processor, the processing conditions can be adjusted to suit the various film and chemical types. The developing solutions are temperature-regulated, circulated and automatically replenished.

These Operating Instructions contain important instructions for installation, operation and servicing of the machine. Please read the provided information carefully to ensure reliable and satisfactory operation of your film processor.

Intended Use

The X-ray film processor OPTIMAX®2010 is intended exclusively for the purpose describe in the introduction above.

X-ray film processors (MDD class I) are employed in “medical” applications (medical products directive) and “non-medical” applications (electrical appliances and EMC directives).

Intended use includes observing the operating instructions, the installation instructions and adherence to the safety notes.

Any application differing from intended use voids the guarantee by PROTEC®.

The owner of the machine will be liable for damages resulting from unintended use or faulty application.

Intended use includes adherence to all statutory regulations concerning occupational safety and radiation protection applicable at the operating site.

Technical Specifications

Film transport:	Continuous roller transport system
Film formats:	In general: Sheet and roll films up to 35.8 cm (14.1 ’’) width; Roll films with leader from 70 mm (2.8 ’’) width; Smallest film format 10x10 cm (4x4 ’’). Mammography type 1161: For processing mammography films. Graphics-art type 1162: With cassette box (LxWxH) 35x13x12 cm (13.8x5.1x4.7’’) for processing roll films.
Processing capacity:	129 films 24x30 cm (10x12 “) per hour (standard unit, film transverse, at 90 s)
Process time:	1.5-3 min.; adjustable in steps of 0.1-min.
Linear speed:	28-56 cm/min., depending on selected cycle time.
Developing time:	25-49 s, depending on selected cycle time.
Tank capacities:	Developer, fixer and water tank 5 litres each
Circulation system:	Developer and fixer are continuously circulated by a circulation pump
Replenishment:	Automatic by film surface measurement in relation to processed film; replenishment can be switched off; time replenishment can be activated.
Developer temperature:	Adjustable 28 - 37 °C (82.4 - 98.6 °F)
Fixer temperature:	Adjusted to developer temperature by heat exchanger.
Dryer temperature:	Adjustable between 10 - 99% of dryer output, temperature achieved depends on line voltage.
Water connection:	Permissible water pressure 2 - 10 bar (29 - 145 psi), permissible water temperature 5 - 30 °C (41 - 86 °F).
Water consumption:	1.9 litre per minute when processing. Water saving mode: 0.9 litres per minute
Drain capacity:	7 litres per minute
Noise level:	Less than 58 dB(A).
Heat emission:	During processing approx. 1.4 kJ/s.

Environmental conditions:	1 Temperature 18 - 40 °C (51.6 - 104 °F), ventilated room, room temperature should be lower than set bath temperature. 2 Relative humidity lower than 80 % up to 31 °C (88 °F), linearly decreasing to 50 % at 40 °C (104 °F) 3 Height above sea level less than 2000 m (6666 ft.) 4 Indoor use
Pollution degree:	2
System protection:	IP 20
Electrical connections:	Electrical specifications are indicated on the model nameplate. Type116x-1-y000: 230 V~ ±10 %, 8.8 A, 50 Hz. Type 116x-2-y000: 230 V~ ±10 %, 8.8 A, 60 Hz. unit conforms to IEC 1010 (EN 61010, VDE 0411) overvoltate category II Type 116x-4-0000: 110 / 120 V~ ±10 %, 12 A, 60 Hz. unit conforms to UL 3101 and CSA 22.2-1010 overvoltate category II
Power consumption:	Stand-by: 0.12 kWh Processing: 1.4 kWh
Weight (unit):	Empty 35 kg (77 lbs) Filled 50 kg (110 lbs)
Dimensions (LxWxH):	77x59x42 (** 112) cm (30.3x23.2x16.5 (** 44.1)")
Floor space required:	0.45 m^2 (4.8 sqft)

** Height incl. optional working table or base cabinet.

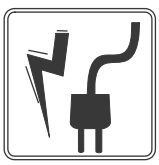
Safety Instructions

To ensure the safe operation of this processor, installation and use should always conform to the instructions contained in this manual.

The developer and fixer chemicals used in the processor should be handled according to the manufacturers instructions. In general: Undiluted chemicals are caustic. For this reason, chemicals should be handled very carefully. Avoid contact with skin, always wear protective clothing, gloves and glasses when handling the chemicals - for example, when mixing and refilling. Also when taking the racks out for cleaning or servicing. If chemicals have come in your eyes, rinse the eyes immediately with cold, running water for approximately 15 minutes and contact a medical doctor afterwards. Inhalation of chemicals can be dangerous to your health and should be avoided. For this reason, always ensure that the room in which the processor is installed is adequately ventilated.

Environmental regulations regarding the storage and disposal of waste chemicals should be obtained from the local water authorities and complied with.

Before opening the unit, switch off the unit and unplug it from the electrical socket. Service and repairs must be performed by trained service technicians only. Use only manufacturer´s replacement parts.



Installation

1. Requirements for installation

a. Fresh water connection: Shut-off tap, thread with 3/4" outside diameter (washing machine connection), Water pressure 2 - 10 bar (29 - 145 psi).

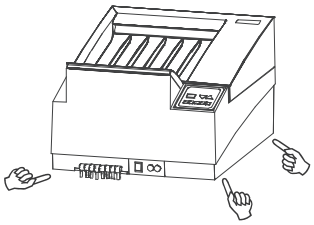
b. Drainage connection: Plastic tube - inner diameter 50 mm (2”) or larger. A ventilated syphon which serves as odour preventor should be included in the planning. The drainage tubes should be installed with a decline of minimum 5 %.
Local Water Authorities regulations should be complied with.

c. Electrical connection: Fused wall socket with earth connection according to electrical data (see technical specifications, page 9). It is also required to install an earth-leakage switch (with 25 A / 30 mA nominal error current).

Electrical connections should be carried out according to regulations by an electrician.

2. Transport

Due to the weight and dimensions of the film processor, OPTIMAX®2010 should always be carried by two persons. To do so, hold the machine at the sides on the bottom (see figure). While putting the machine down, watch the position of the levelling feet to prevent damaging these.



3. Set-Up

Unpack the Processor. Remove cover and transport securing brackets on the sides of the roller racks. Remove roller racks - start with the dryer rack.

The standard version of OPTIMAX®2010 is delivered as a tabletop processor with a three part base plate. If the machine is upgraded with the optional stand or cabinet, the two side parts must be removed from the base plate.

Table-top installation

If the unit is to be set up on a table top or work table, only the four unit feet need to be screwed out and levelled..

Attention!
Machine should not be installed on table-top without adjustable feet. as this would block the ventilation openings under the machine and cause overheating.

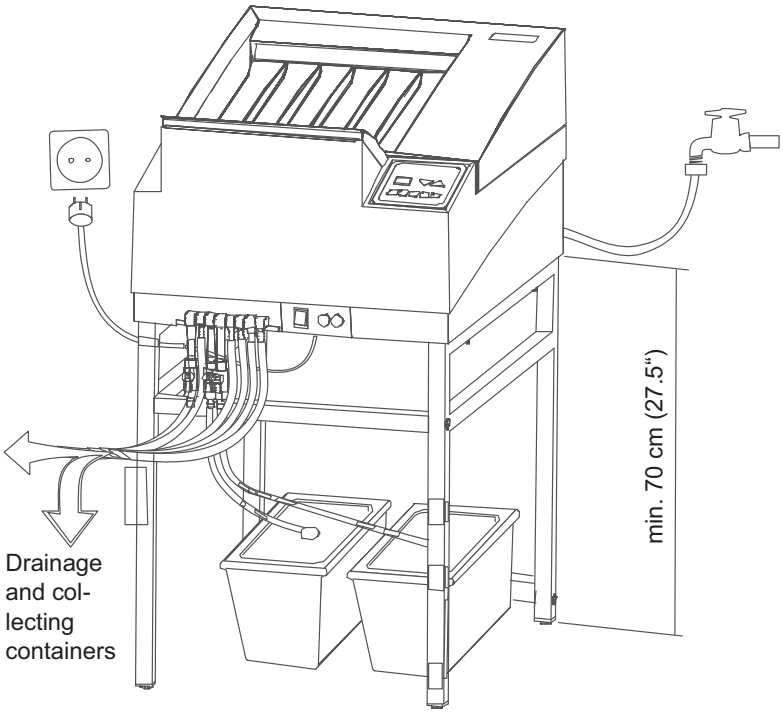
Installing on processor stand or base cabinet

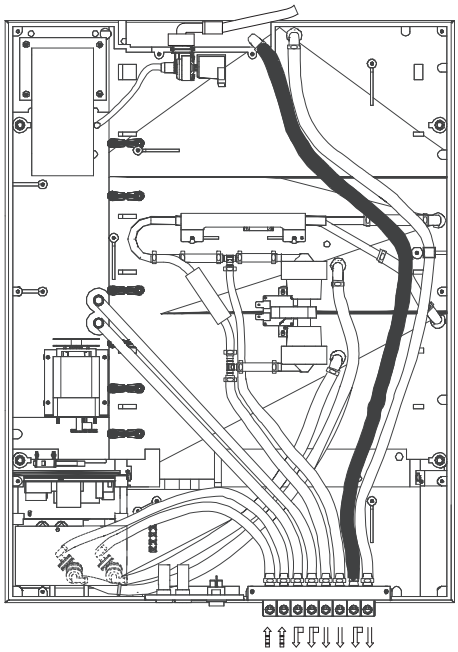
In the event that the processor is to be installed on the stand or cabinet (optional accessory), the processor will be mounted directly to it. Mount processor according to manual included with stand or cabinet (the adjustable feet inside the accessory bag are not required). Remove the two side parts of the base plate before.

Finally the processor needs to be levelled:

Place spirit level across the sidewalls of processor and adjust the levelling feet accordingly. Replace the racks into the processor and close the latches.

4. Connecting the processor





Water connection:

Fit water-inlet hose (grey) at the rear of the machine and connect to the prepared fresh water supply.

Water overflow:

The water overflow hose (∅ = 16 mm) is likewise connected at the rear of the unit. The hose is installed as described in the next section.

Remark:

There are two options for installation of the water overflow at the front of the unit. Install the pre-assembled hose in the unit and connect it to the overflow outlet at the unit front. Upon delivery this outlet connection is a dummy only (see graphics on the top right).

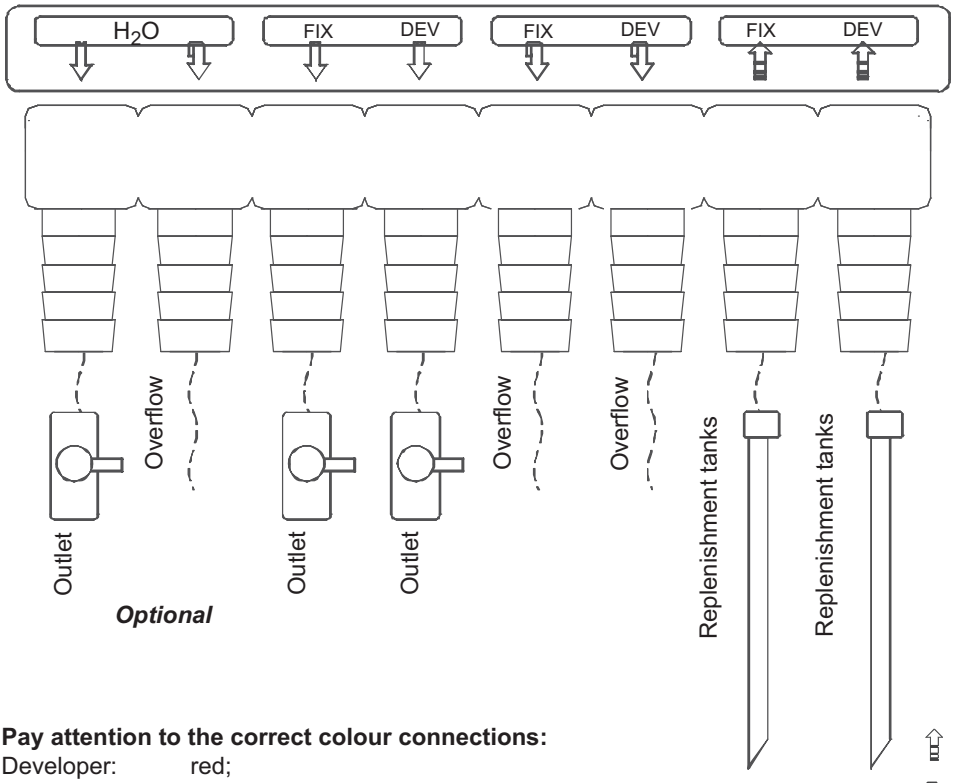
All other hoses (see diagram page 12): Connect the enclosed hoses according to colour system onto the front of the machine. Put hose clip (enclosed in accessory bag) over hose end, before attaching to connection. Warm up hose end (with hot water or lighter) and push onto the respective connection. Finally push clip over hose and connection.

Cut hoses to required length. Then integrate the stop cocks into the three drainage hoses in such a position, that they are easy to reach.

Connect the suction pipes to the hose ends for the replenishment tanks using hose clips. Put the suction pipes through the cover opening into the respective replenishment tanks and snap them in.

The overflow and drainage hoses from the developer and fixer should be guided into their respective collecting containers. The overflow and the drainage of the water can either be guided into the drainage syphon or into respective collection containers.

Hose Connections



Pay attention to the correct colour connections:

Developer: red;
Fixer: blue;
Water: clear

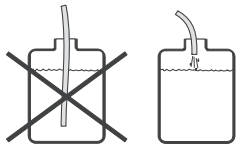
⇧ Replenishment

⇩ Overflow

⇓ Outlet

Danger of Overflow!

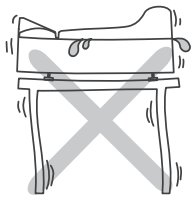
Use the included cable ties (accessory bag) to secure the hoses. Fix all hose ends which lead into the syphon or collecting container, so that they do not drop into the liquid - otherwise liquid may overflow.



Very important:

The hose piping should be straight (without the hoses going up and down) with a constant decline. The hoses should be as short as possible and without bends and kinks. This is very important for the water overflow hose. Bad piping work will cause the machine to overflow!

Inform yourself of the local water board regulations regarding drainage. These regulations may differ from information in this manual, but they should be complied with.



If the machine is installed table-top, ensure that the table is stable enough and does not wobble.

Initial Operation

Test run

Important!
Processor should not be run dry!
Upon commissioning and every refilling the pumps must be vented.

a. Close the three drainage stop cocks and fill the tanks and replenishment containers with water. Open water inflow tap. Connect electrical socket and switch the machine on. Water now flows into water tank. The circulation pump activates, however the hosing of the machine must be ventilated.

b. Ventilation of the replenishment pump:
Switch to the manual mode and switch on the replenishment pump. Let the pump run until no more bubbles rise inside the tanks.

c. Ventilation of the circulation pump:
The circulation pump runs after switching on the machine and ventilates itself. If this should not work, a loud running noise will be heard. Switch the machine off again. Open the stop cocks of the developer and fixer for five seconds and switch machine on again. Repeat this procedure until no more air bubbles are visible in the developer and fixer baths and until the circulation pump runs quietly.

d. Check all hose connections for leakage. Switch machine off and drain water out.

Filling the Processor with Chemicals

Prepare chemicals inside the replenishment containers according to manufacturers instructions.

Filling the processor manually

By using a suitable container, pour chemicals into the respective tanks. First the fixer and then the developer. Caution: when filling, be sure that chemicals do no splash from one bath into another. When fixer solution is mixed with developer solution, the developer chemical is destroyed.

Caution! When filling the unit manually, be sure not to allow liquid to flow into the slot of the cover switch or onto the operating panel. This may damage parts.

Snap each suction pipe into the respective cover of it's replenishment container and close it carefully. Place containers under processor.

Using replenishment pump

Filling of processor can also be done by use of the replenishment pump (this takes much more time). The chemicals containers need to be filled manually with at least 1.0 litres of fresh chemicals, to ensure the pumps will not run dry. Snap each suction pipe into the respective cover of it's replenishment container and close it carefully. Place containers under processor. Activate the filling process by means of the automatic tank filling function. The function stops automatically as soon as the set level has been reached. Latest after 20 minutes, the function will shut off automatically. Limitation: The function may fill up tanks of developer and fixer to different levels. If this happens, then use a suitable container to fill up the tanks completely.

Warning, hot surface!

Operation

Short Overview and Control Panel

① Display working parameters

② Arrow button “Up” = increase parameter value

③ Arrow button “down” = decrease parameter value

Mode Buttons

④ Processing time in minutes

⑤ Developer temperature in °C

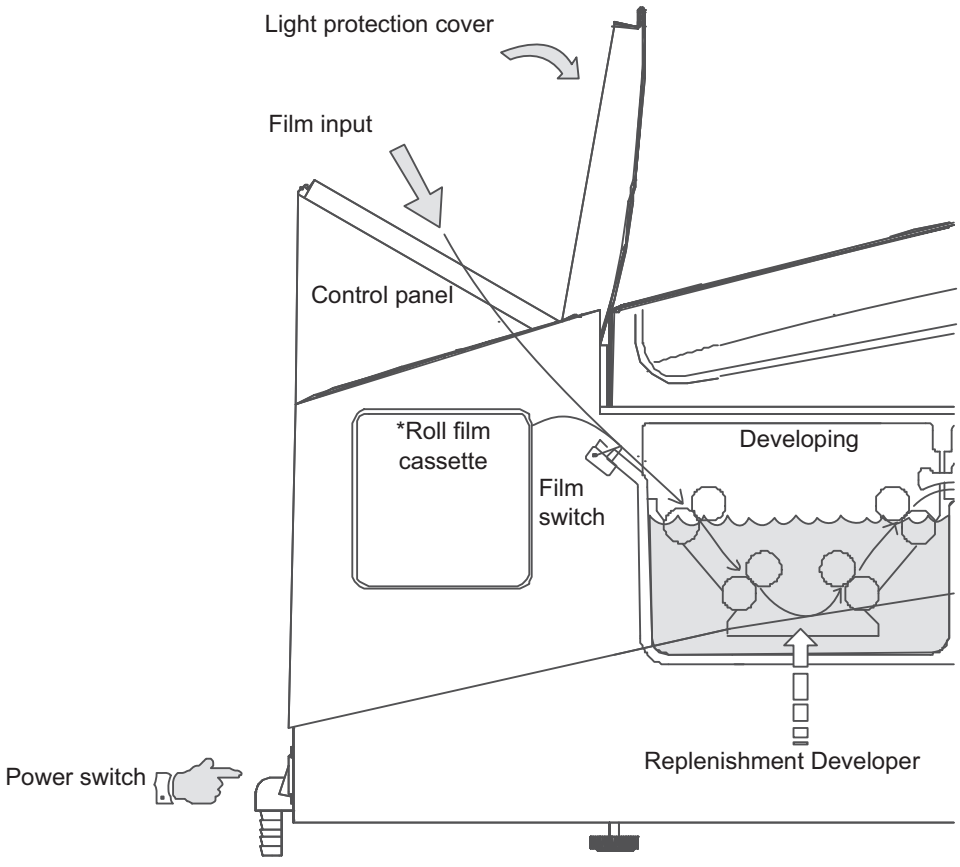
⑥ Dryer output in %

⑦ Replenishment time in seconds

Important!

Safety function stops film transportation when cover is removed. Therefore keep cover placed on the machine when processing films.

*When processing roll films in cassettes, pull approx. 15 cm of film out of the cassette and fold the corners (see page 21). Place cassette into cassette box and feed film into the infeed. Only machines with cassette box.



Attention:

Upon first operation and each refilling of a developer check the function of the circulation pump and vent the pump if required (see page 9).

Before use...

1. Close water-drainage stop cock.
2. Open water tap.
3. Switch processor on.
4. Check liquid level in replenishment and drainage collecting containers.
5. Wait until the start-cycle has been completed or until Developer temperature is reached.
6. Run cleaning films through processor.

Working procedure

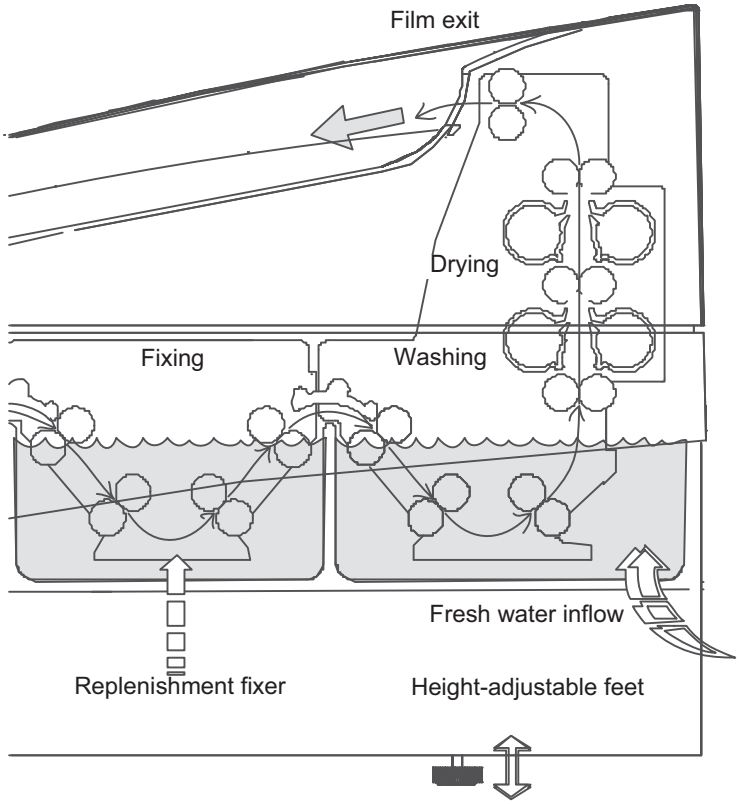
7. Processing films:
   Open the light protection cover, insert the film on the left of the feed tray, during the feeding please watch the Film-feed-display "– –".

After work...

8. Switch the unit off.
9. Close water tap.
10. Open water drainage stop cock

Stand-by mode:

When no film is being processed, the machine switches to Stand-by. The chemicals remain at a constant temperature. The film transport and water inflow activate at intervals to avoid crystallisation of the chemicals on the transport rollers. Entry of the next film is possible at any time.



Do not place any object on the processor.

Switching the Machine On

Before switching the machine on, open the fresh water tap and close the water drainage tap (under control panel). Then switch the machine on (main switch is situated under the control panel). Once the machine is switched on, a “Start-cycle” of eight minutes duration is activated: A replenishment cycle is carried out, the water tank fills automatically and the chemical baths heat up. During this “Start-cycle” no films can be fed into the machine. The display shows two bars “– –” when the processor is not ready and no films can be fed in. This is the case during the “start-cycle” and also when the baths have not reached the temperature. Until the developer temperature is not reached, the developer temperature button (5) is flashing. It is possible that the chemical bath has not reached the required temperature even after the “Start-cycle” has been completed. You need to wait until the developer temperature is reached, before inserting films. Wait until the bars “– –” disappear from the display.

Automatic mode

After completion of the “Start-cycle” and after a film-processing, the machine automatically goes into the stand-by mode. In the stand-by mode the processor can be started at any time by placing a film into infeed tray. Note that films can only be processed when the developer temperature is reached. When the display shows two bars “– –” no films can be fed into the machine. The temperature in the bath is too high or too low. However, when a film was fed into the machine, two bars with decimal points “–. –.“. To avoid a jamming of films wait before feeding the next film in until this display disappears (which is also signalled by an acoustic sound).

A film in the feed-tray is registered by two film detection switches and the machine starts up. The film is pulled into the machine and transported through the developer, fixer and water baths. The remaining time of processing i.e. until the film finally leaves the machine is displayed, when no more film is in the infeed-tray and the processing time button was pressed. Each working-parameter can be called up on the display by pressing the respective mode-button, however, during processing, parameters cannot be altered. The temperatures of the developer and dryer are automatically regulated by the controller. The replenishment rate of developer and fixer chemicals is activated according to the processed film-surface (film-surface measurement). The dryer is heated to the set value. Inside the dryer, the film is dried and then normally output onto the cover. The machine then goes into the stand-by mode. To keep the machine in working condition during the stand-by mode, the electronics have been furnished with two specialities: The Anticrystallisation Function and the Time Replenishment.

Anti-crystallisation function

In stand-by mode, the film transport, the dryer ventilation are activated every 20 minutes for a period of 20 seconds. This prevents the build-up of crystals on the rollers. This function cannot be switched off.

Time replenishment (Anti oxidation function, Flood replenishment)

Also during the stand-by, the developer chemicals are subject to change which causes their deterioration. By means of the time replenishment, a replenishment cycle is activated after 60 minutes without replenishment. With this function, the quality of the developer chemicals are maintained even when standing idle for long periods. The time replenishment function can be deactivated.

Setting of time-replenishment:

1. Switch the unit off.
2. Press the buttons processing time (4) and replenishment time (7) simultaneously and keep pressed.
3. Switch the machine on again and release the pressed buttons.
4. Switch the time replenishment on or off with the cursor keys (2 and 3). If you enter “0”, time replenishment is off, “1” switches it on.
5. Switch the unit off to save the settings.

Working Parameters

The processing machine develops, fixes, rinses and dries the film materials automatically. The film and chemical requirements can be adjusted accordingly and stored in the control unit.

Display of working parameters:

1. Switch processor on.
2. Press the respective mode button (4-7) and keep it pressed to display the set value.

Press the respective mode button (4-7) and let it go to display the current actual value.

Setting the working parameters:

1. Switch processor on.
2. Machine must be in the stand-by mode and no film must be in the processor.
3. Press the respective mode button (4-7) and keep pressed: The display shows the set working parameter.
4. Change value by means of the arrow buttons (2 and 3) until required value appears on the display. The upward arrow button (2) increases and the downward arrow button (3) decreases the value.
5. Release the mode button.

Processing time

The processing time, is the time, it takes the front end of a film from the infeed of the processor until it reaches the film exit. The processing time is set by the speed with which the film is transported through the machine. Depending on the requirements, this time can be varied from to 1.5 minutes (90 seconds) to 3 minutes, adjustable in 0.1-minute-steps (Adjusting the processing time: see “Working Parameters” on page 17).

Processing and developer time relation		
Processing time (min)	**Developer time (s)**	**Infeed speed (cm/min)**
1.5	25	56
1.7	28	49
2.0	33	42
2.3	38	37
2.5	41	34
2.7	44	31
3.0	49	28

Developer temperature

The developer temperature of the different film-materials depends on the developing time. The faster a film has to be developed, the higher the temperature must be. The developer temperature can be set between 28-37 °C according to the individual requirements (Setting the developer temperature: see “Setting the working parameters:” on page 17). If the temperature of the developer bath is lower or higher than the set value, then the developer temperature button (5) is flashing and the display shows two bars “– –”. Before feeding a film into the machine, wait until the temperature has been reached and the displayed bars “– –” disappear.

The following chart shows guiding value relations between developer temperatures and processing times. Variations are possible depending on the various films and chemicals.

Processing time and developer temperature relation	
Total processing time (min (s))	**Developer temperature (°C)**
1.5 (90)	33 - 35
2.0 (120)	32 - 34
2.3 (138)	31 - 33
2.5 (150)	31 - 33
3.0 (180)	30 - 32

Dryer temperature

The dryer temperature cannot be set in degrees Celsius. However the dryer output can be set in a range between 10-99 % (100 %), to adapt it to the film material to be processed. *“95”* for example, corresponds to 95 % of the maximum output of the dryer heating. To avoid dryer spots on the film, the dryer output may not be set too high. Adjust the temperature so that the film just gets dry (Setting the dryer temperature: see “Working Parameters” on page 17).

Remark: Depending on mains voltage, dryer temperatures above 65 °C may under certain circumstances not be reached. The information in the table below are mere guiding values. Different combinations of film material, chemicals and ambient conditions may require different dryer output settings.

Processing time and dryer output	
Total processing time (min (s))	**Dryer output (%)**
1.5 (90)	85 - 99
2.0 (120)	75 - 95
2.3 (138)	65 - 85
2.5 (150)	55 - 75
3.0 (180)	45 - 65

Replenishment time

The replenishment of the developer and fixer chemicals is automatic. By means of the film detection switches at the film-feed, the surface of the processed films is calculated and after 0.25 m^2 film a replenishment cycle is automatically activated. The replenishing volume can be set by means of the replenishment time. The replenishment time may be set in a range of 10-99 s. The replenishment can be switched off by entering *“0”*. This is advisable in rare cases only.

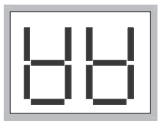
The chart below shows the replenishment time to be set for the requested replenisher rate per m^2-film surface. The standard setting is 40 sec. with 600 ml replenisher rate per m^2 film surface. The replenisher rate has to be adjusted depending on film material, chemicals and film throughput.

Relation of replenishment time and replenisher volume		
Replenisher volume (ml/m^2)	**Replenishment time (s)**	**Replenisher rate (ml per cycle)**
150	10	37.5
300	20	75
450	30	112.5
600	40	150
750	50	187.5
900	60	225
1050	70	262.5
1200	80	300
1350	90	337.5
1485	99	371.3
Values for pump setting 100 % supply volume or for to 85 % for 60 Hz supply.		

Machine Cover Safety Disconnection

The machine cover may only be removed for service and maintenance purposes. The processor cannot be started without the cover. In the event that the machine cover is removed during film-throughput, the film transport will be stopped. On the display the error message *"E1"* will be displayed. This will render the film unsuitable. The error will be reset when the machine cover is reinstalled. Thereafter the motor may run a little faster for a short time.

Auto fill Function



In case new chemicals have to be filled into the processor (after installation, tank cleaning), the tanks can be filled automatically by means of the auto fill function. In the process, the tank is filled for a fixed period of 20 minutes, that is, chemicals are pumped from the replenishment containers to the tanks. Also the water bath will be filled (3 min. period). The display will show two symbolized tanks (see right). When the auto fill function has been completed, the machine enters the stand-by mode. If the respective baths are full before the time is up, the auto fill function can be stopped manually. The level switch in the developer bath detect a full bath and switches the pump off. The automatic tank filling can also be terminated manually.

Starting up the auto fill function:

1. Switch the unit off.
2. Press and hold the replenishment time button (7), switch the unit on.

Manual cancellation of the Auto fill function:

1. Press and hold the replenishment time button (7) and press "arrow down" button (3).

Manual Mode

In the manual mode, the processor works without the film detection switches. The film transport has to be started and stopped manually. All the set values in the manual mode are also valid in the automatic mode. Please note that the Infeeding-film-display ("– –") is deactivated. Replenishment continues to operate based on detection of the film surface processed. Only if the film detection switches are activated, will film measurement be performed. In the manual mode, a replenishment cycle can also be activated manually.

Switching to manual mode:

Switch the machine on. During stand-by, press the arrow-buttons "up" (2) and "down" (3) simultaneously. When in manual mode the display is flashing.

Switching back to automatic mode:

In manual mode with film transport off press both arrow-buttons "up" (2) and "down" (3) simultaneously.

Manual starting and stopping the film transport:

1. Switch to manual mode.
2. Press the processing time button (4) - the button illuminates.
3. Start the film transport by pressing the arrow-button "up" (2) or stop the film transport by pressing the arrow-button "down" (3).

Manual replenishment:

1. Switch to manual mode.
2. Press the replenishment time button (7) - the button illuminates.
3. Start the replenishment cycle by pressing the arrow-button "up" (2) or cancel the replenishment cycle by pressing the arrow-button "down" (3).

Water Saving Mode

The water saving mode reduces the water consumption. If the water saving mode is activated, exactly 50 % less water is consumed.

Activating the water saving mode:

1. Switch the unit off.
2. Press and hold the buttons processing time (4) and dryer output (6) simultaneously.
3. Switch the machine on again and release the pressed buttons.
4. Switch the water saving mode off or on with the arrow buttons (2 and 3). If you enter *"0"*, the water saving mode is off; if you set *"1"*, it is on.
5. Switch the unit of to save the settings.

Stop Film Transport

In a case of a film-jam inside the machine, the film transportation can be manually interrupted. To stop the film transport press both arrow-buttons (2 and 3) simultaneously. Related topics:

see "Manual starting and stopping the film transport:" on page 20

see "Film is caught up in the racks" on page 29

OPTIMAX 2010 with 2 pumps see description starting on page 53.

Rollfilms and Paper Films

Roll films with a polyester lead of at least 10 cm length can be transported. The adhesion must be chemical resistant.
Roll films without lead and paper-films must be folded on the corners, as shown in the diagram, before being fed into the machine.

Use of Memory Function

In the memory two sets of parameters can be stored and be recalled to the operating memory.

Store processing parameters

1. Set machine to preferable parameters e.g. bath temperature, processing time etc. (see manual).
2. Press buttons 4 and 5 “Enter Memory” simultaneously to enter the memory mode.
3. Use the buttons 2 and 3 “Select” to select the parameter memory (P1 or P2). These save the parameters, old values will be overwritten.
4. Press the button 5 “Store” to store parameters and to leave the memory mode.

Recall processing parameters

1. Press buttons 4 and 5 “Enter Memory” simultaneously to enter memory mode.
2. Use the buttons 2 and 3 “Select” to select the parameter memory (P1 or P2) from which the parameters are to be recalled.
3. Press button 4 “Recall” to recall parameters (copy into the operating memory) and to leave the memory mode.

To leave memory mode without change
Press button 6 “Exit”.

Choose the same bath temperature for all stored programmes. Of course different bath temperatures can be stored too, but when changing the programme you always have to wait until the changed bath temperature is reached.

Care

Daily Care

Before use...

1. Remove dirt and dust from film-infeed with soft cloth.
2. Run 2 - 3 cleaner films through the processor to remove all accumulated dirt and dust from the rollers.
3. Check the liquid level in the replenishment containers and if necessary refill.

After use...

When working has been completed at the end of the day, the water must be drained from the machine. This reduces the growth of algae in the water bath. For that purpose open the water drainage stop cock (see page 12 bottom).

Attention: Do not let any liquid drop inside the processor or run over the control. Liquids may cause damage to the processor.

Weekly Care

The developer chemicals cause residue build-up in the machine. This residue has a negative effect on the developing process of the film material. For this reason the processor has to be regularly cleaned of this residue.

Do a weekly clean of the roller racks, which only takes a few minutes.

1. Switch machine off and remove cover.
2. Loosen the securing latches of the roller racks (red, blue and beige) of the drive shafts of each roller rack at the right side.
3. Rinse all racks thoroughly under warm running water and then leave to drain off. Use a soft sponge (do not use a scouring-pad, as this would scratch the rollers!) and remove the dirt from the rollers. During this procedure, the rollers can be turned by turning the drive shaft.
4. Wipe the infeed-roller-pair (first roller-pair of developer rack) dry.
5. Replace the racks: red = developer, blue = fixer, beige = water / dryer. Ensure that the racks are firmly installed and do not forget to close the securing latches on the drive shafts.
6. Replace machine cover and ensure it is securely closed.
7. Clean processor outer casing with damp cloth. Do not use aggressive cleaners or solvents.

Please note:
When removing the rinsing / drying roller-rack, ensure that no water gets into the film dryer air channel.

Thorough Cleaning

Depending on the quantity of films processed, a thorough cleaning is necessary every 3 - 6 months. Tank cleaners are available for developer and water baths. The fixer bath is cleaned with water. When preparing chemical tank cleaners, follow manufacturer's instructions explicitly.

How to proceed:

1. Switch the machine off and empty all tanks by opening the stop cocks. Attention! Machine will not drain off, if it is switched on.
2. Remove machine cover. When all tanks are emptied, close stop cocks again. Now fill the fixer-tank with water. Prepare cleaner solutions for developer and water baths and fill into respective tanks.
3. Remove suction pipes from the replenishment containers and place them in a water filled bucket. Attention! Do not add chemical cleaners here!
4. Close machine cover and switch machine on.
5. Start the film transport (see “Manual starting and stopping the film transport:” on page 20) and keep running for 10 to 20 minutes. During this the installed roller racks will be cleaned.
6. Important: After completion of tank cleaning, the tank should be rinsed thoroughly with clean water. To do this, fill the machine with fresh water twice and each time, let the machine run for a 10 minute period. Empty the tanks and re-close the stop cocks.
7. Take out the roller-racks and rinse them thoroughly with running water. Remove remaining dirt from the rollers by using a sponge and clean thoroughly. Doing this, the rollers can be turned by turning the drive shaft. Wipe the infeed-roller-pair (first roller-pair of developer rack) dry. Replace the racks.
8. Refill the tanks with respective chemicals. This can be done by hand or automatically (see “Auto fill Function” on page 19). Replace the suction pipes into the replenisher containers. In certain circumstances the circulation system must be ventilated: see “Test run” on page 13 item b).
9. For quality check, process test films.

Before you go on holiday...

or in the event that your processor will not be in use for longer than two weeks, all the chemicals have to be emptied out of the tanks. In case you don't want to do a complete tank cleaning at once, then fill the tanks after emptying, with water.

Attention: Do not use alcohol containing solvents to clean the machine!

The colour changes in the baths is normal; it is caused by the properties of the chemicals!

Maintenance / Disposal

Maintenance Protocol

Installation

Name:	Machine type:	Serial number:
Technician:	Training:	by:
Telephone:	Date:	Guarantee until:

Parameters Set

Developer temp.:	Dryer temp.:	Cycle time:
Dev. reg. volume:	Dev. reg. volume:	Anti-oxidation:
Developer:	Fixer:	Film type:
Changed by:	Date:	

Developer temp.:	Dryer temp.:	Cycle time:
Dev. reg. volume:	Dev. reg. volume:	Anti-oxidation:
Developer:	Fixer:	Film type:
Changed by:	Date:	

Developer temp.:	Dryer temp.:	Cycle time:
Dev. reg. volume:	Dev. reg. volume:	Anti-oxidation:
Developer:	Fixer:	Film type:
Changed by:	Date:	

Maintenance work performed (see page 25)

Maintenance work performed	Maintenance work performed	Maintenance work performed	Maintenance work performed	Maintenance work performed
Date:	Date:	Date:	Date:	Date:
Name:	Name:	Name:	Name:	Name:
next maintenance:	next maintenance:	next maintenance:	next maintenance:	next maintenance:

Maintenance work performed	Maintenance work performed	Maintenance work performed	Maintenance work performed	Maintenance work performed
Date:	Date:	Date:	Date:	Date:
Name:	Name:	Name:	Name:	Name:
next maintenance:	next maintenance:	next maintenance:	next maintenance:	next maintenance:

Maintenance work performed	Maintenance work performed	Maintenance work performed	Maintenance work performed	Maintenance work performed
Date:	Date:	Date:	Date:	Date:
Name:	Name:	Name:	Name:	Name:
next maintenance:	next maintenance:	next maintenance:	next maintenance:	next maintenance:

Attention:

Never start the machine up unless it is filled with liquid!

Recommended Maintenance Work:

1. Functional check
   film intake / film transport / replenishment / bath heating / dryer heating / water supply
2. Cleaning
   - 2.1. Switch off machine, remove cover
   - 2.2. Empty all three tanks
   - 2.3. Close drain cocks and fill tanks with water
   - 2.4. Install cover, switch machine on
   - 2.5. Fill two additional vessels with water, put suction pipes into these vessels and activate replenishment for at least two minutes (to remove residues of chemicals from replenishing hoses)
   - 2.6. Switch machine on for a few minutes
   - 2.7. Switch machine off
   - 2.8. Empty all tanks
   - 2.9. Prepare tank cleaning agent for developer and water tank according to manufacturer´s instructions

Attention:

Do not use chlorine containing cleaning agents!

   - 2.10. Fill developer and water tank with tank cleaning agent **(<u>do not</u> use the replenishment pumps to do so)**
   - 2.11. Fill fixer tank with water
   - 2.12. Place suction pipes into empty tanks
   - 2.13. Install cover, switch machine on
   - 2.14. Wait until the operating temperature is reached, approx. 30 °C (observe information concerning temperature, time, cleaning procedure contained in the data sheet of the tank cleaning agent)
   - 2.15. Activate manual programme and transport
   - 2.16. After approx. 15 minutes (observe information concerning temperature, time, cleaning procedure contained in the data sheet of the tank cleaning agent) switch film transport off
   - 2.17. Remove cover, neutralise developer tank (observe information concerning temperature, time, cleaning procedure contained in the data sheet of the tank cleaning agent)
   - 2.18. Switch machine off
   - 2.19. Empty all three tanks
   - 2.20. Fill machine with water and switch it on
   - 2.21. Put suction pipes into vessels with water
   - 2.22. Activate regeneration pumps for at least five minutes
   - 2.23. Check all pumps for tightness
   - 2.24. Switch machine off
   - 2.25. Drain tanks
   - 2.26. Fill tanks 3/4 with water
   - 2.27. Switch machine on
   - 2.28. Activate replenishment pumps manually until tanks overflow
   - 2.29. Activate film transport for a few minutes
   - 2.30. Switch machine off and drain all three tanks

2.31. Repeat item 2.20 to 2.30 if required (observe information e. g. concerning temperature, time and cleaning procedure outlined in tank cleaner data sheet)
2.32. Remove roller racks from the machine and remove dirt under flowing water using a soft rag or sponge
2.33. Clean all toothed gear wheels, axles, bearings and rollers, check them for damage (replace if required)
2.34. Demount the cover sheet of the film intake and clean it using a soft rag
2.35. Clean inlet plate using a soft rag
2.36. Mount the cover sheet of the film intake
2.37. Align roller racks and re-insert them in machine
2.38. Fill machine with chemicals
2.39. Switch machine on
2.40. Adjust bath temperature to previously adjusted value
2.41. Feed cleaning film (approx. 4 pieces)
2.42. Check function as described under item 1
2.43. Approx. 15 minutes after reaching of the set bath temperature, measure it for confirmation and re-calibrate if required (see operating manual page 39)
2.44. Perform sensitometric test

Be sure to dipose properly of used machines.

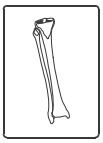
Used machine contain valuable materials that should be recycled and turned over for proper treatment. Please be sure to turn used machines over to approved recycling centres.

Problems and Solutions

Advice on Film Defects

Your processor has been constructed for long term use. However, if irregularities occur, you will find help to locate the problem below. Please check the listed points, before calling your service-technician.

Films do not have enough density

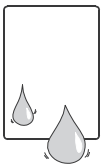


- Bath temperature is too low.
- Developing time too short.
- Exposure time is too short.
- Replenishment rate of developer too low.
- Developer chemicals are exhausted: Renew.
- Fixer solution has been mixed into developer: Renew. Clean and rinse bath well before refilling.
- Circulation is broken down.

Too high a density

- Bath temperature too high.
- Developing time too long.
- Exposure time is too long.
- Replenishment rate of developer too high.
- Developer chemicals are too high diluted: Renew.
- After renewing chemicals: Starter is missing.
- Circulation is broken down.

Films will not dry



- If warm air comes out of air channel in the dryer, chemicals and film type should be checked.
- Fixer solution is exhausted or diluted.

Film has a yellow-green surface

- Not fixed correctly. Check the film type and fixer chemistry.
- Fixer solution is exhausted or diluted. Replenishment rate of fixer is too low.

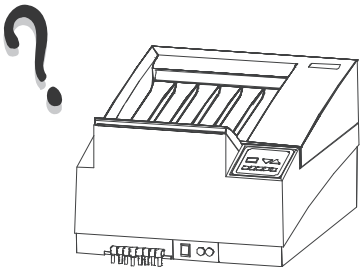
Scratches, pressure marks, dirt on film

- Prior to processing films, run cleaner films through the processor.
- Pressure marks caused by careless handling, finger nails etc.
- Rollers are polluted. Clean tanks and roller racks.

Cloudy film

- Level in developer is too low.
- First guide bar of fixer rack is dirty (condensate or crystals). Clean roller-racks.
- Developer is old or circulation not working.
- Try processing films by infeeding them with emulsion side up.

Advice on Machine Errors



Unit does not switch on

- Ensure that electrical plug is firmly inserted into socket. Ensure that the electrical socket is supplying power by testing with an appliance e.g. a table light.

Rinsing water does not flow

- Open water inflow tap.
- The water pressure in the water supply system is too low: Pressure in the plumping system too low: Minimum pressure has to be 2 bar (29 psi).

Replenishment rate too high

- Check the programmed times of replenishment cycle and replenishment time.

Replenishment rate too low

- Check the programmed times of replenishment cycle and replenishment time.
- Check whether the machine can be started by means of each of the two film detection switches in the feed slot. If one of the film detection switches is defective, call your service technician. In the meantime, double the programmed replenishment time.

Replenishment pump does not pump

- Check whether the replenishment containers are full and that the end of the suction pipe is positioned under the liquid level.
- Check whether there is air in the replenishment pipes. The replenishment hose is aspirating air. Check the hose connections.

Water tank overflows

- Water drainage hose (overflow) is bent. The hose end should be positioned above the drainage level in the syphon.›‹›‹
- Check water drain opening in the tank and the hose for blockage and residues. The drainage hoses should have a constant fall.

The film does not transport correctly

- Film is fed in and gets caught in the machine: Check the positioning of the racks in the machine and make sure that the latches are closed.

Film cannot be fed, the display shows “E1”

- Close machine cover securely, paying special attention that the switch on the rear of the control panel is actuated.

Film is in the infeed and nothing happens

- Display is flashing: Control is in the manual mode. Switch back to Automatic Mode (see page 20).
- Insert the film into the film feed so it passes the film detection switches. Feed the film to activate one of the switches. If the unit should not start, activate the other switch. If the processor still does not start, call your service technician. In the meantime, with limitations the processor may be operated in the Manual Mode (see page 20).

Film is caught up in the racks

- Switch machine off and remove cover.
- Check in which rack the film is caught up in and remove the respective rack.
- If possible, catch hold of the film end by hand and by manually turning the drive-shaft, pull the film out of the rack.
- Replace the rack and secure with fastener. Replace machine cover and switch the machine on again.
- If a film is caught up in the machine due to a power cut, it can be transported out of the machine by activating the transport with a film in the infeed (machine can also be started up in the manual mode, see “Manual starting and stopping the film transport:” on page 20).

Important notes:

Ensure correct seating of roller racks; keep the lock closed at all times.

Don’t operate processor with empty replenishment tanks.

After a long machine shut down check bath level and refill if necessary.

Error messages

Machine errors are shown on the display as abbreviations. The cause of error is explained below. For service technician: problem solution see “Trouble shooting” in service manual.

Display	Cause and possible correction
E1	Cover switch is not actuated. Place cover correctly on the machine and ensure that the cover switch behind the control panel is actuated. If the error cannot be corrected, then the cover switch may be broken.
UU	Too low level of the developer bath. Check the level and fill up by pumping manually or refilling manually.

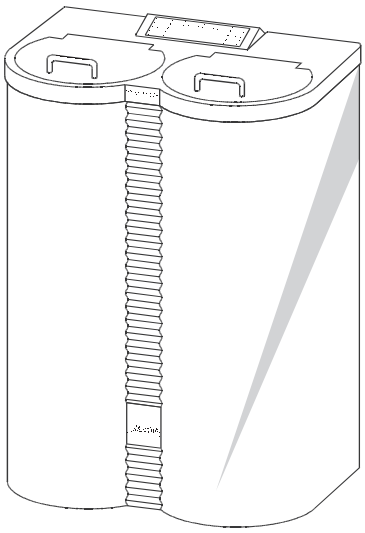
PROMIX® A40

The PROMIX® A40 is a fully automatic chemical mixing machine for preparing developer and fixer bath chemicals of either powder form or liquid concentrates. All stages are guided and controlled by means of a microprocessor. Thanks to a large reserve tank, up to 3 machines can be connected and continue to operate, without having to interrupt the working process.

Due to its patented construction, the PROMIX® A40 is easy to operate, reliable, fast and virtually service free.

The PROMIX® A40 replaces the usual replenishment tanks in the darkroom.

Ask your local dealer for more information.



Technical Specifications

Tank capacities:	each 20, 25, 30 or 40 litres
Reserve tank:	each 13 litres
Water connection:	3/4", 2 - 10 bar (29 - 145 psi)
Pump capacity:	38 l/min
Mixing times:	variable, 2, 3, 5, 10, 15, 20, 25, 30 minutes
Power source:	220-240 VAC, 200 W, 50/60 Hz Fuse: sb 2 A / 250 V
Weight:	28 kg empty, 108 kg full
Dimensions:	(WxHxD) 65 x 93 x 44 cm

English

AIRCLEAN® 200

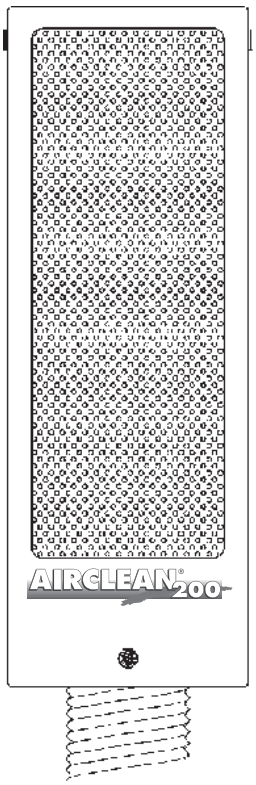
At last you can breathe again

AIRCLEAN® 200 cleans the air from your processor. Unpleasant chemical odours are absorbed through the large active charcoal filter. Allergies are prevented and you can breathe again freely.

Simple installation directly on to the processor (no breaking through the wall).

Filter exchange cheap and fast approx. every 3 months.

Ask your local dealer for more information.



Technical Specifications

Cleaning capacity:	approx. 200 m^3/hour
Filter:	Active charcoal
Power consumption:	43 W
Power source:	220-240 V, 50/60 Hz
Weight:	7 kg
Casing:	Stainless steel, plastic coated
Casing dimensions:	(WxHxD) 21 x 63 x 17 cm

Service Manual

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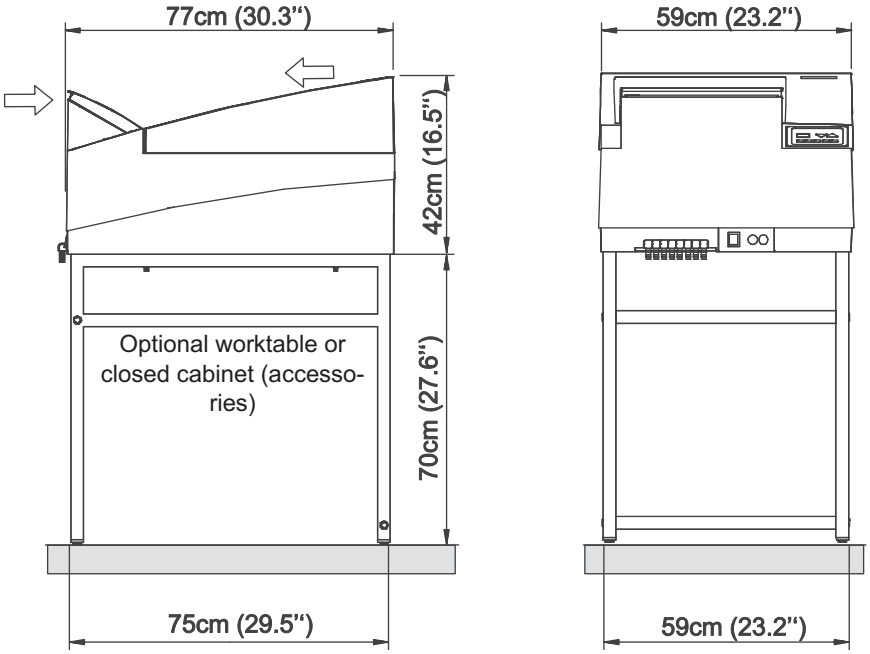
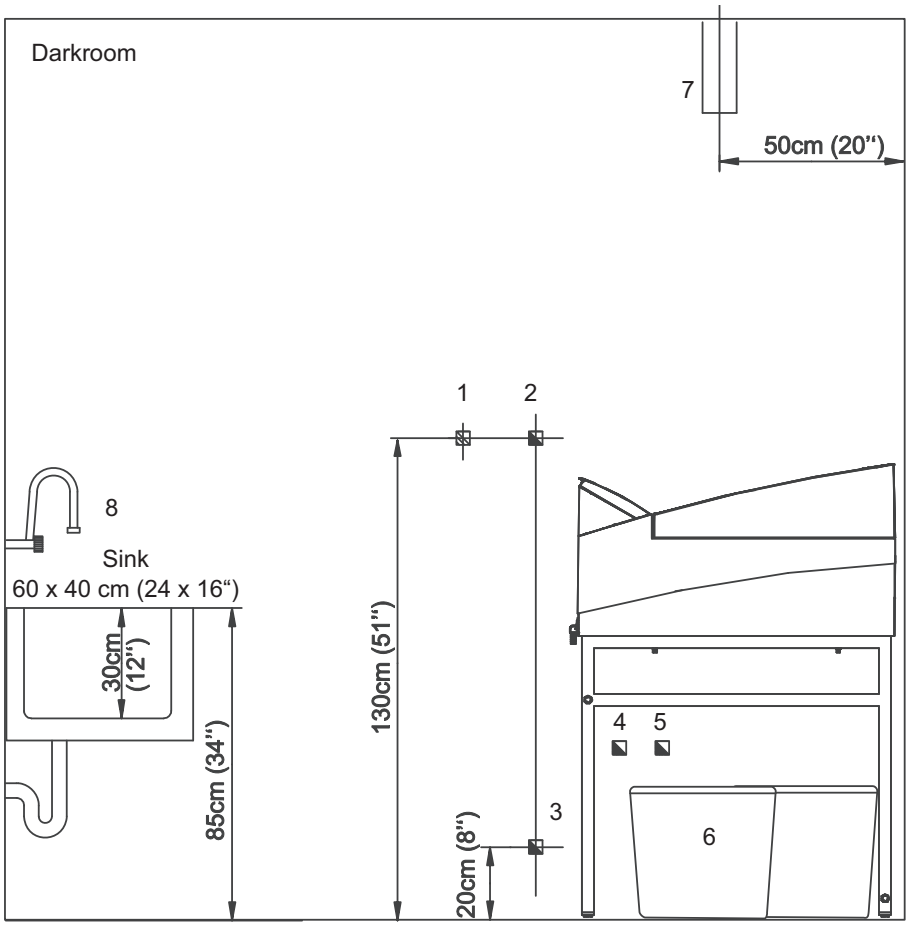
English

Installation Data

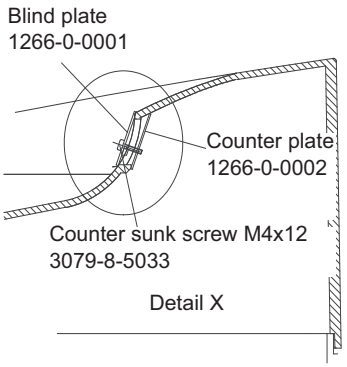


1. Wall socket
   220-240 V, 16 A resp. 110 V, 15 A (depending on machine model). Power lead should be equipped with Earth-Leakage Switch, 25 A / 30 mA nominal error-current. In addition, a power control switch can be installed.
2. Fresh water connection 3/4” with stop cock, permissible pressure 2-10 bar, water temperature 5-25 °C.
3. Drainage plastic pipe PVC ∅ 50 mm (2“) incl. syphon.
4. Drainage resp. collecting containers for used developer.
5. Drainage resp. collecting containers for used fixer.
6. Storing space for replenishment tanks: Below machine or externally.
7. Ventilation of darkroom is necessary.
8. Sink with freshwater and flexible hose. Interior dimensions minimum (LxWxH) 60x40x30 cm (24x16x12“).

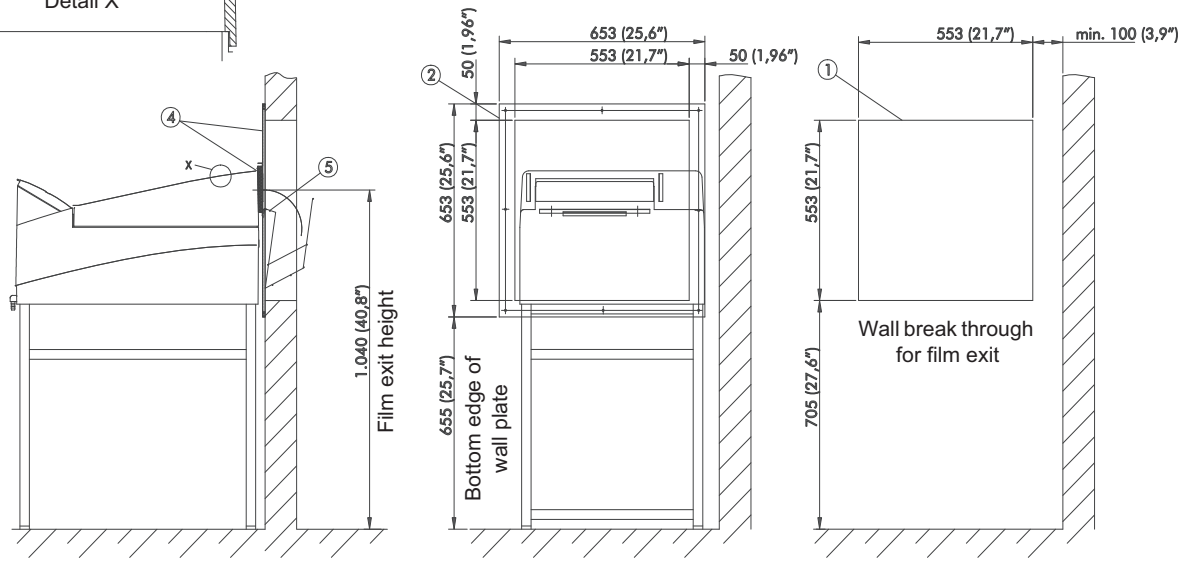


Measures and positions are recommendations

Through the wall mounting "film output"
- Film output to the light room for OPTIMAX®2010 type 116x-y-6000



All dimensions in mm.
Heights applicable in connection with PROTEC® worktable 1267-0-0030.



1. Wall opening according to drawing.
2. Fasten wall plate with enclosed eight screws (note markings).
3. Fix blind plate with screws and straps on the film outlet (Detail X).
4. Push processor up against wall plate and place foam rubber light protection between processor and wall plate.
5. Hang in film catch basket at wall plate from the backside.
6. Check mounting-set for light im-permeability and function.

Please note:

Pull sealing wedge off before removing machine cover.

Trouble Shooting

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1 Algae

1.1 Excessive algae growth in water tank

Algae growth inside the water tank is not only annoying, it causes increased cleaning work and leaves residue on the films. When algae growth increases, countermeasures are in demand:

- When work has been completed at the end of the day, drain water out of the machine.
- Clean dryer-water rack regularly. Use soft sponge and soap to remove residue from the rollers.
- Install a particle filter system in the fresh water supply for the processor.
- If water tank overflows due to algae growth blocking the overflow hose, then the overflow hose can directly be connected to the connection at the water tank inside the machine.
- If no other solutions can be found, then usage of Anti-Algae-Agents can be a great improvement (automatic dispensers work the best). However, it is known that cleaning agents containing chlorine may corrode rubber rollers and high-grade steel in the tank area (check before use).

2 General

2.1 Unit does not switch on

- Ensure that the power socket conducts power.
- Check machine fuses.

For replacement exclusively use PROTEC® gold cap fuses. These fuses are optimized for use under existing conditions.

- While power switch is on, check the following components: Voltage on contact of main switch - if no voltage: - change main switch. Check input voltage at electronics. If the voltage is normal, replace the electronics. If there is no voltage: check the cable.

2.2 No display but circulation pumps run

- Check input voltage of 5 V at the contacts no. 1 and 8 of the 8-pole-plug X18 from the control panel PCB. If voltage is present, then replace the control panel.
- Disconnect the temperature sensor of the developer bath (X15) and check display again.

3 Drive

3.1 Film transport does not run, film processing has started

- Display “E1”: see “Error messages” on page 29.
- Check screwing of chain wheel on motor- and driveshaft.

3.2 Machine does not start automatically

- When the machine is switched on, insert a film into the feed. If the display shows two bars with decimal points, then at least one of the film detection switches is in order. Check the function of both switches, replace as needed.
- The display shows “E1”: The cover switch is not actuated by the latch on the cover. Cover switch has no current passage when activated: Replace.

3.3 Machine doesn't stop automatically, motor and fan run continuously

- Display is flashing: Control is in the manual mode. Switch back to Automatic Mode (see page 20).
- The display continuously shows two bars with decimal points: Actuator of the film detection switch is jammed. Readjust the switch or replace it. If the switches are defective, the machine can still be used in the manual mode (see page 20).
- The power output section may be defective, if so replace it.

3.4 Drive motor does not run

- Display “E1”: see “Error messages” on page 29.
- No continuity of cover switch when activated: Replace.
- Check drive motor: If voltage can be detected on motor, then motor is defective.

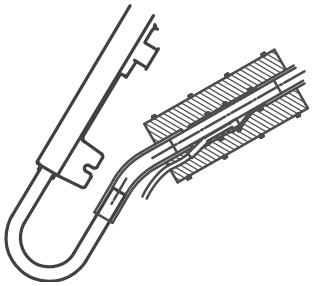
4 Baths

4.1 No circulation in bath

- Circulation pump works but no circulation in bath: Air lock in heating and circulation system. Vent the pump.
- Particles in the pump chamber. The pump chamber can be easily opened by removing the four clips. When closing again ensure that the rubber seal is positioned correctly and not damaged.
- Check connection of pump, circulation pump possibly defective.

4.2 Developer temperature too high

- Check attachment of temperature sensor. This should be firmly positioned on tube and completely covered with foam rubber.
- Check sensor: Check voltage on sensor between pin 3 (green) and pin 2 (brown). At room temperature the tension must reach approx. 0.3 V.
- If the sensor has no fault then electronic is defective.



4.3 Developer temperature too low

- Check circulation pump. Air lock in the circulation pump: Ventilate pump (see page 13). If no circulation can be detected: Check electrical connection of recirculation pump; pump may be defective.
- Bath is not heated: Check temperature safety switch on heat-exchanger. Check heating element: impedance across the element should reach approx. 66 Ω.
- Check temperature sensor (see 4.2).
- If no error can be found, then the electronics may possibly be defective.

4.4 Developer temperature too low, fixer temperature too high

- Air lock in the developer circulation pump: ventilate circulation (see page 13).

4.5 Developer bath temperature too high or too low (display shows values of 21 °C or 40 °C)

- Check temperature sensor. Sensor is either not connected or defective.

4.6 Switch-over from °C to °F

The developer temperature can be displayed in either °C or °F.

Switch-over of temperature unit:

1. Switch the unit off.
2. Press and hold the buttons processing time (4) and developer temperature (5) while switching the unit on.
3. Select the desired unit of measure with the arrow keys (2 and 3). C for Celsius and F for Fahrenheit.
4. Switch the unit off to save the unit displayed.

4.7 Calibration of bath temperature / actual bath temperature is different from displayed value

Differences between displayed temperature and measured value in the developer bath can be adjusted. An adjustment may be necessary after replacement of a bath temperature sensor. An adjustment is recommended when the deviation exceeds ±0.5 °C and is mandatory if the deviation exceeds ±1,5 °C.

Calibration process

1. Switch the unit off. Press and hold the developer temperature button (5) and switch the unit on. The display indicates the developer temperature measured by the sensor in 1 degree increments.
2. Measure the actual temperature inside the developer bath using a calibrated thermometer.
3. Adjust the displayed value in 1-degree-steps to the thermometer value, using the arrow buttons (2 and 3). Display of the digit after the decimal point is activated by pressing the developer temperature button (5). Adapt the value after the decimal point to the thermometer value, using the arrow buttons.
4. Switch the unit off to save the calibration.

4.8 Developer level switch constantly displays “UU”

- Observe notes under 6.1 “Replenishment pump does not work or works insufficiently”, page 40.
- The developer level switch is not positioned correctly. The switching point is below the developer overflow. Readjust the height of the level switch.
- The level switch is defective (e.g. closed permanently).
- If all of the above points are okay, replace the, control unit.

5 Film Defects

5.1 Films will not dry

- Check the set dryer output (“99” corresponds to maximum, that is full heating output).
- No air comes out of air channel: check the connections of the fan, e. g. fan defective.
- Cold air comes out of air channel: check the connections of the heating element in the air channel, the heating element may be defective (resistance must reached approx. 45 Ω).
- Hot air comes out of air channel, but the film is still not dried to satisfaction. Check chemicals and film type. If this leads to no solution, then the transport speed of the machine can be reduced.

5.2 The film does not transport correctly

- Check the positioning of the racks in the machine and make sure that the latches are closed.
- Check the roller racks: Position of the guide elements, rollers are in correct position and are not loose, flat springs are not bent, all gears are in place.
- Motor runs: The worm gear of the drive shaft should be secured with a splint to avoid twisting. Check the screws and positioning of the chain and chain wheel.

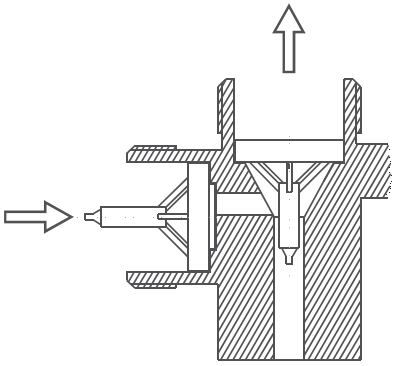
5.3 Scratches, pressure marks, dirt on film

- Straight scratches in the infeed direction indicate faulty guide elements. Check each rack and straighten up the guide elements. If mechanically damaged, replace the guide elements.
- Pressure marks caused due to polluted or damaged rollers. Check rollers for visible damage. Rubber rollers sometimes swell up. Exchange defective rollers.

6 Replenishment

6.1 Replenishment pump does not work or works insufficiently

- Clean valves inside connection tube of pump.



Install valve-insert correctly: Pay attention to flow-through direction!

- Check filter in the suction pipe (repl. container) and clean it if necessary.
- Replenishment hose aspirates air. Check connections.
- Check eccentric position. Flow rate is 240 ml/min at maximum eccenter position 100%.
- (60 Hz: 240 ml/min at 85 %!)
- Measure the voltage at the connection X6 (replenishment pump) on the power output section while the replenishment is switched on (in manual mode). If no voltage can be registered - replace the power section PCB. Remark: 2 pump version: developer replenishment pump at X6 and fixer replenishment pump at X5.

7 Dryer

7.1 Dryer fan does not run or runs with too low speed

- Check the correct connecting of the fan cables: *bl = blue; bk = black; br = brown*.
- If the fan supply lines have been transposed, the dryer fan will run at half the nominal output only.

8 Water

8.1 Rinsing water does not flow

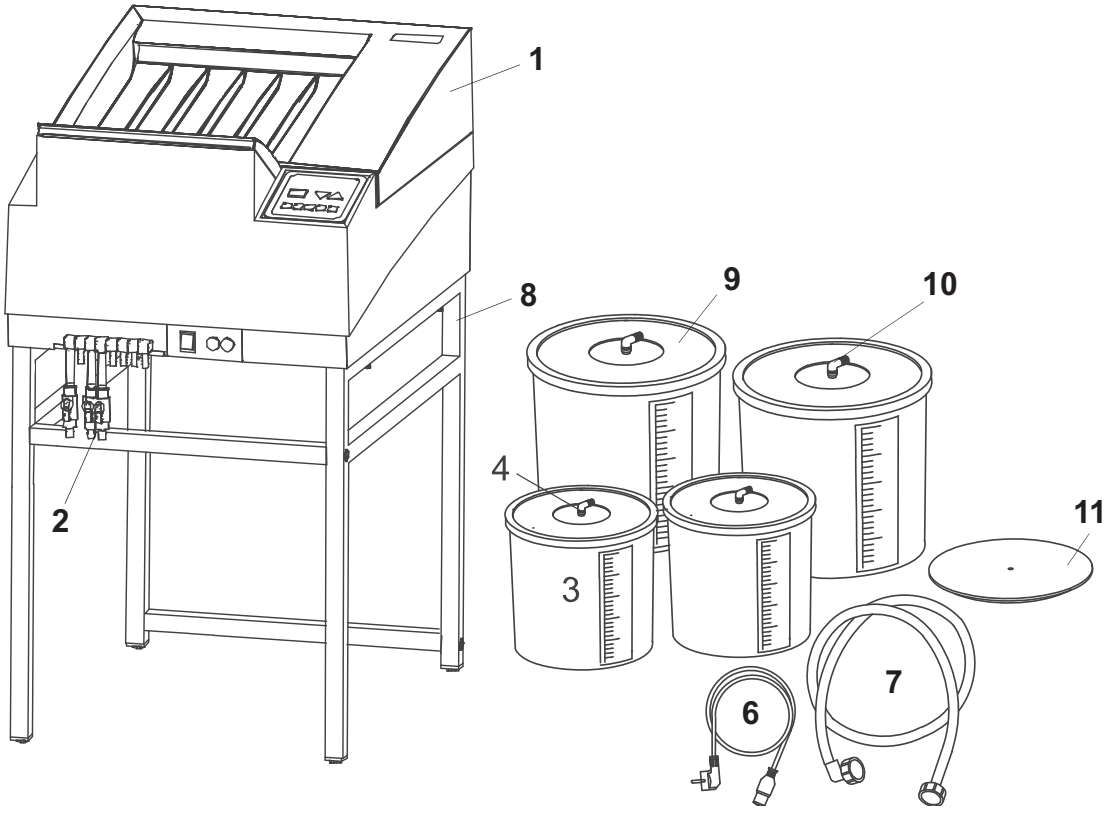
- The water pressure in the water supply system is too low: Minimum pressure 2 bar (29 psi).
- The valve opens, but no water flows through: filter at inflow is blocked.
- Check the green water inlet hose inside the machine.
- The water level switch is not positioned correctly: switching point is too low (below the overflow level), therefore no fresh water is supplied.
- The level switch is defective (e. g. permanently open).
- Start the unit in manual mode and measure the voltage at the connection X4. If no voltage can be registered, replace the power output section PCB.

8.2 Water tank overflows

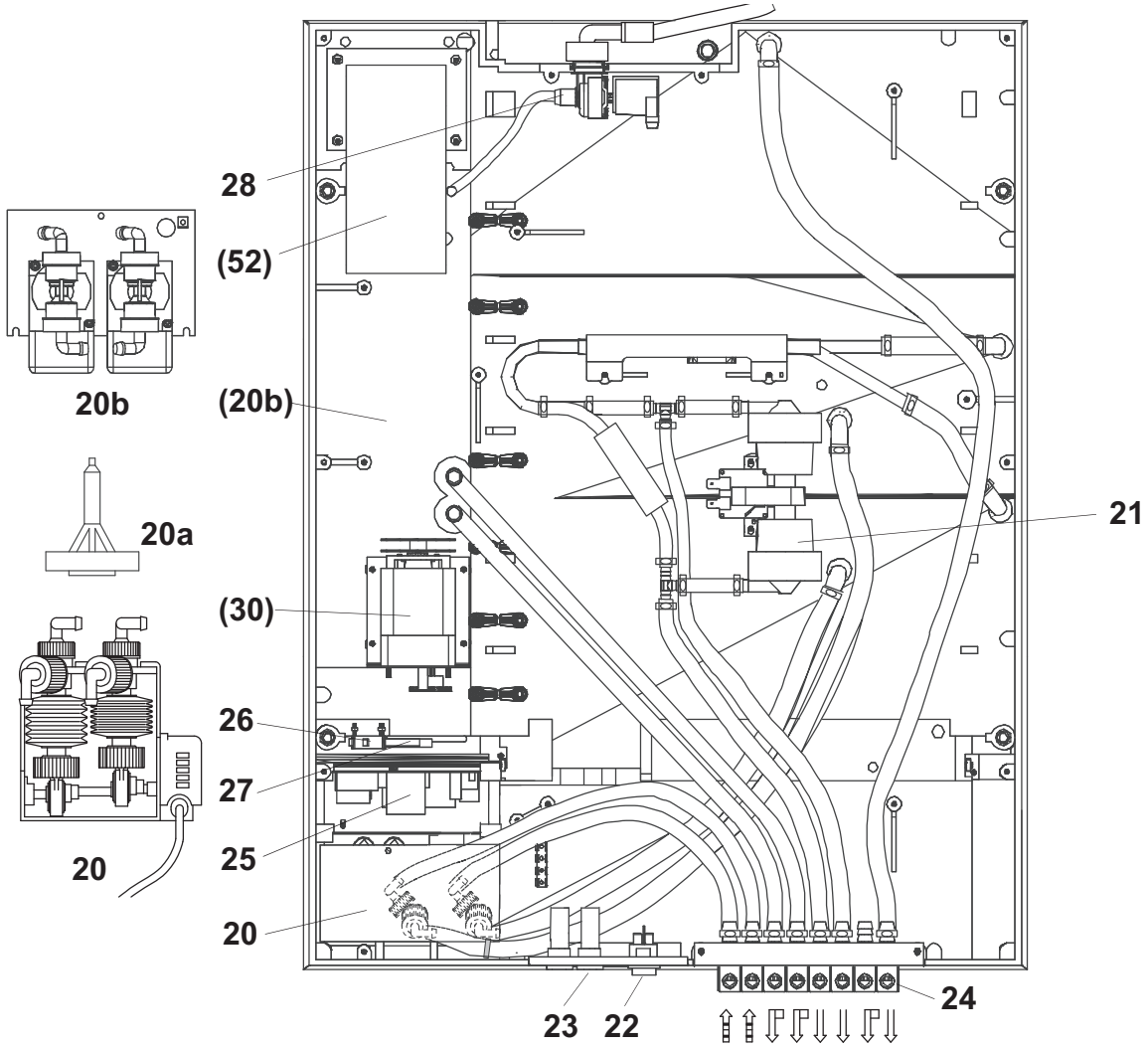
- Water drainage hose (overflow) should have a constant fall. The hose end should be positioned above the drainage level in the syphon.›‹›‹
- Check water drain opening in the tank and the hose for blockage and residues.
- When extreme algae growth is noticed, the overflow can be connected directly at the back of the water tank.

8.3 Rinsing water constantly switches on and off

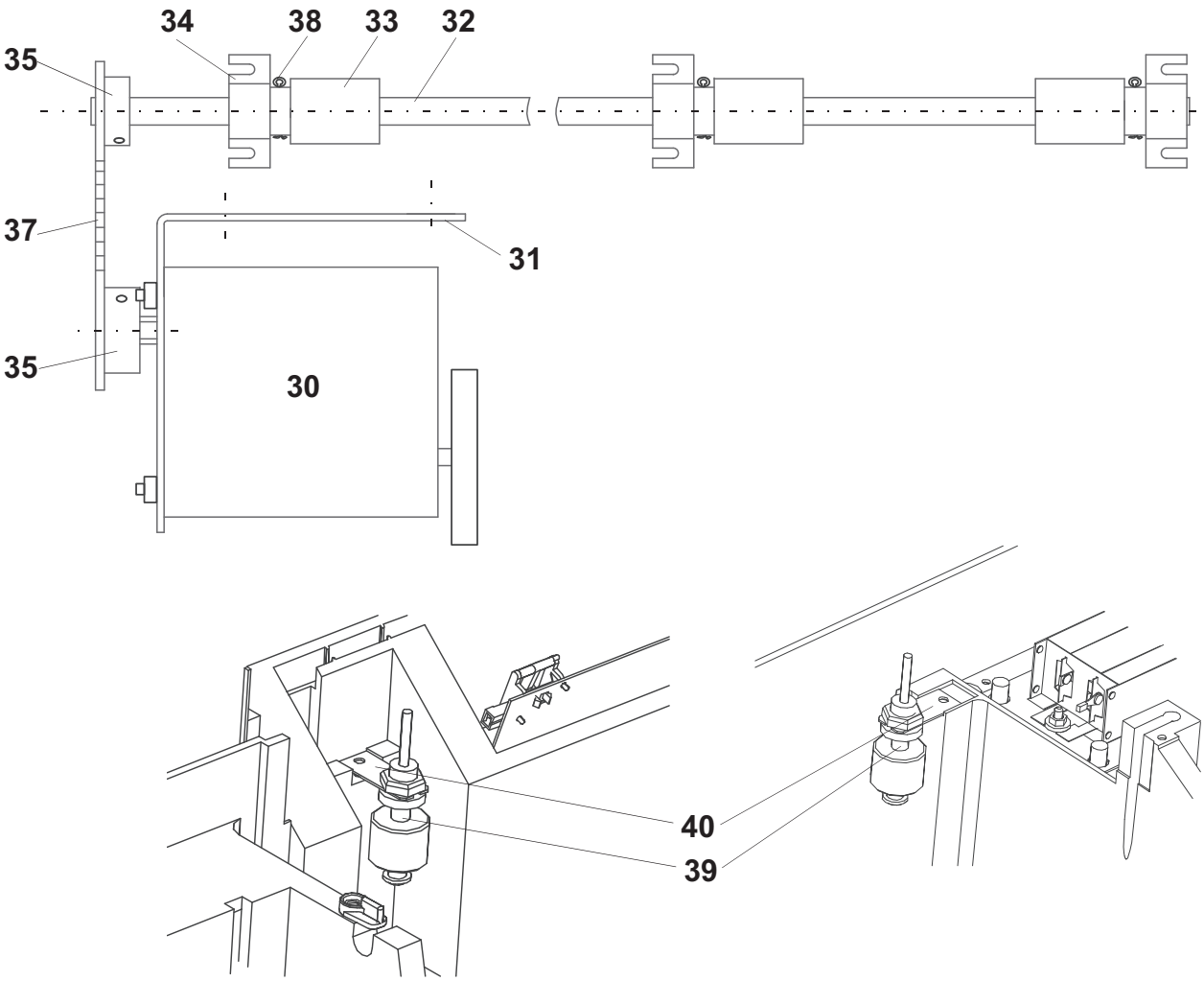
- At regular intervals (approx. 1 minute on and 1 minute off): The water saving mode has been activated.
- At short intervals: th level switch is not positioned correctly (exactly on the overflow level). Insert the rack. If the error continues to occur, readjust the height of the level switch.



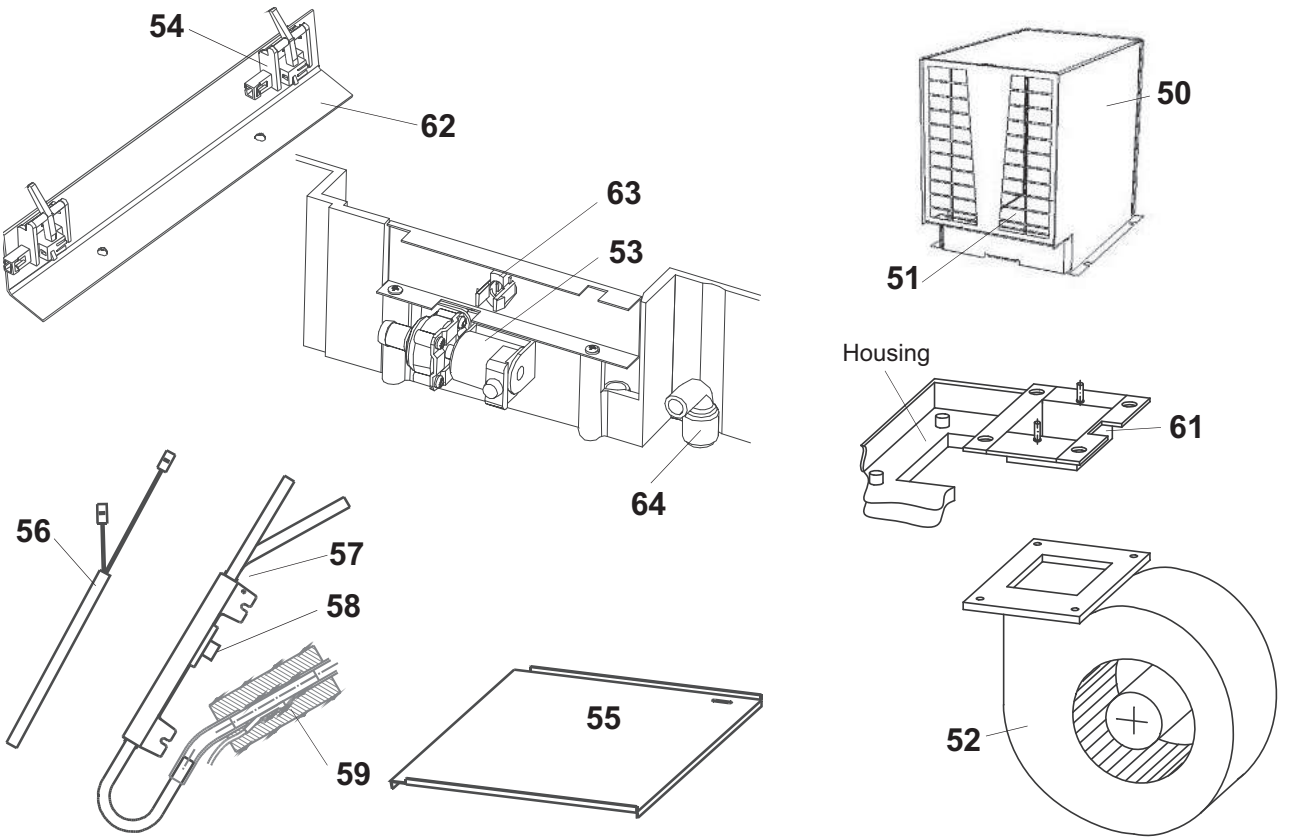
Pos.	Order No.	Description:
1	1160-0-0200	Cover complete
2	2006-0-0005	Drain stop cock 10 mm
3	1170-0-2000	Replenishment tank 12 l dev.
	1170-0-2100	Replenishment tank 12 l fix.
4	1170-0-1760	Suction pipe with filter for 12l tank, round
6	2004-0-0010	Electrical power lead 220-240 V
	2004-0-0021	Electrical power lead 220-240 V
7	2018-0-0001	Water inlet tube
8	1267-0-0030	Processor stand
-	1267-0-0040	Closed base cabinet
9	1101-0-2000	Replenishment tank 25 l dev.
	1101-0-2100	Replenishment tank 25 l fix.
10	1101-0-1700	Suction pipe with filter for 25l tank
11	1101-0-4100	Floating cover developer
-	2018-0-0012	Hose 10 x 2 mm, clear, reinforced
-	2018-0-0009	Hose 10 x 2 mm, blue, reinforced
-	2018-0-0008	Hose 10 x 2 mm, red, reinforced
-	2018-0-0005	Hose 4 x 1 mm, green
-	2018-0-0021	Hose 9 x 2 mm, red, transparent
-	2018-0-0022	Hose 9 x 2 mm, blue, transparent
-	2022-0-0014	Tube clamp Snap
-	2022-0-0019	Wire tube clamp
-	2022-0-0027	Wire tube clamp
-	2022-0-0028	Wire tube clamp
-	2022-0-0005	Wire tube clamp
-	1101-0-4600	Floating balls, 300 pcs.
-	1101-0-4800	Floating balls, 200 pcs.



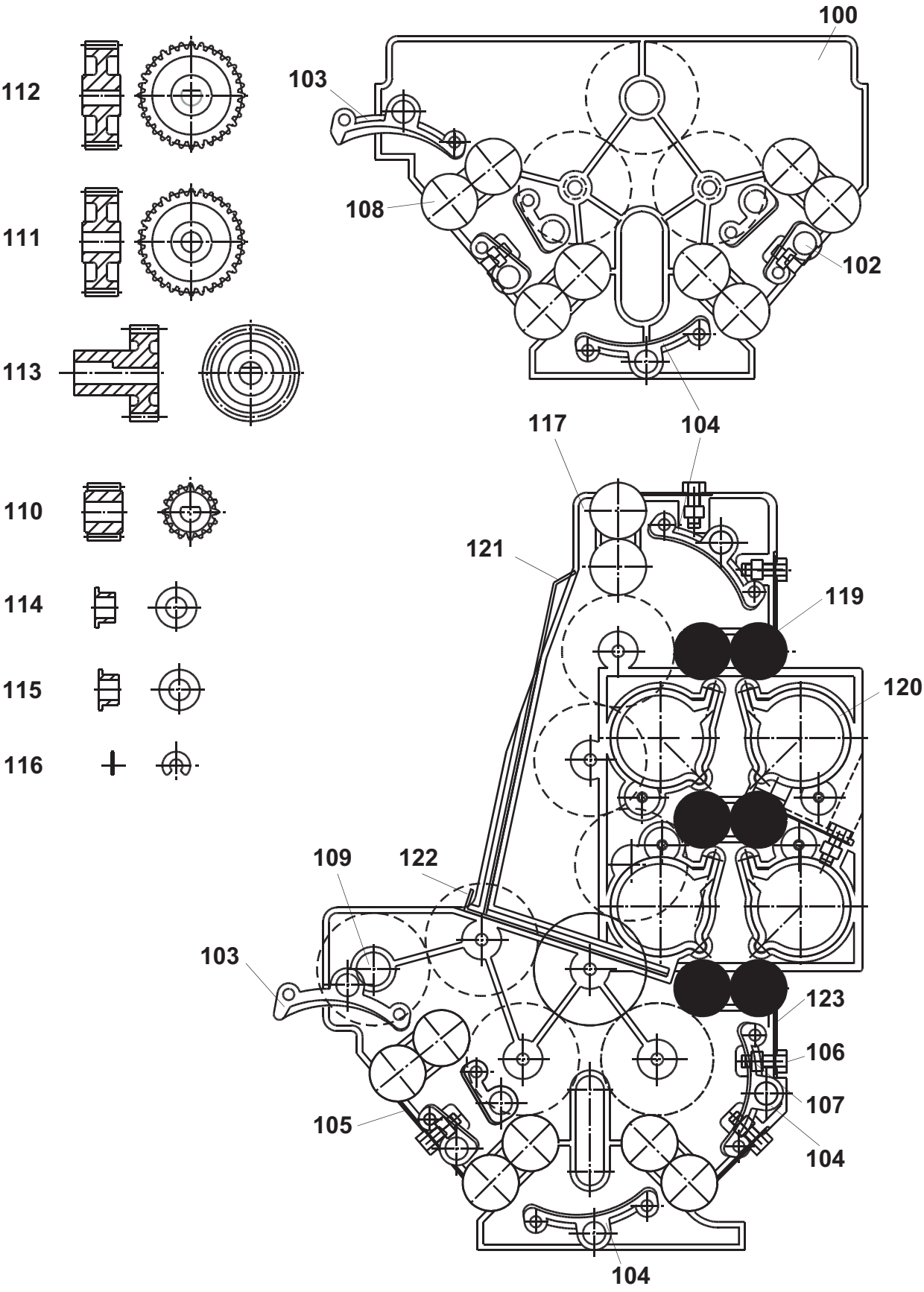
Pos.	Order No.	Description:
20	0202-1-0008	Replenishment pump 2KBA, 220-240 V, 50/60 Hz
	0202-6-0008	Replenishment pump 2KBA, 115 V, 50/60 Hz
20a	0002-1-0008	Conical valve f. pos 20
20b	0202-5-0002	Replenishment pump KBR-3X, 220-240 V, 50/60 Hz
	0202-6-0002	Replenishment pump KBR-3X, 115 V, 50/60 Hz
21	2002-1-0016	Circulation pump 220-240 V, 50/60 Hz
	2002-6-0016	Circulation pump 110 V, 50/60 Hz
22	2028-0-0023	Main switch 220-240 V
	2028-0-0036	Main switch 110 V UL
23	2010-0-0004	Fuse holder
-	2010-0-0010	Fuse slow blow in gold, T 10A/250V
-	2007-0-0004	Cover for fuse holder
22+23	2028-0-0036	Device switch, therm. 110-120 V UL
24	1160-0-0702	Angle connection (aluminium)
25	0160-5-1300	Electronics 220-240 V
	0160-6-1300	Electronics 110-120 V
-	1160-0-0705	PVC panel (control unit)
26	0170-0-2400	Micro switch (Cover)
	0170-4-2400	Micro switch (Cover) UL
27	2007-0-0010	Actuator f. micro switch
28	2021-0-0001	Screw-in connector



Pos.	Order No.	Description:
30	2001-1-0004	Main drive motor 220-240 V, 50 Hz
	2001-2-0004	Main drive motor 220-240 V, 60 Hz
	2001-6-0004	Main drive motor 120 V, 50/60 Hz
31	1170-0-1101	Motor bracket
32	1170-0-1501	Drive shaft worm-gear
33	1170-0-1503	Worm-gear
34	1170-0-1502	Bearing block
35	1170-0-1506	Chain wheel t=12
	1170-0-1504	Chain wheel t=14
	1170-0-1505	Chain wheel t=16
	1170-0-1102	Chain wheel t=17
	1170-0-1507	Chain wheel t=18
37	2037-0-0002	Chain 6 mm with coupler link
38	3000-9-4013	Split pin 2.0 x 20 mm, A4
39	2012-0-0013	Level switch
40	1120-0-1502	Bracket for level switch

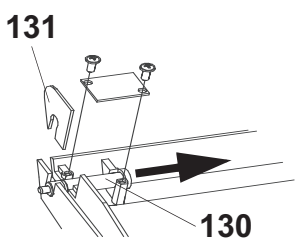


Pos.	Order No.	Description:
50	1170-0-1301	Air channel
51	0170-0-1300	Heating element 230 V, 1100 W
	0170-6-1310	Heating element 110 V, 900 W
52	2008-5-0007	Dryer fan 220-240 V, 50/60 Hz
	2008-6-0007	Dryer fan 115 V, 50/60 Hz
53	1160-5-1900	Solenoid valve 220-240 V, 50/60 Hz
	1160-6-1900	Solenoid valve 115 V, 50/60 Hz
54	2007-0-0015	Film detection switch
55	1160-0-0105	Film feed tray
56	2003-5-0002	Heating element 230 V, 800 W
	2003-6-0002	Heating element 120 V, 400 W
57	1130-0-2101	Heat exchanger
58	2005-0-0005	Temperature safety switch mounted on heat exchanger
59	0190-0-2200	Temperature sensor
61	1170-0-1302	Channel dryer heating
62	1160-0-0801	Support bracket for film detection switch
63	2027-0-0012	Strain relief
64	1160-0-0710	Hose stub, rubber

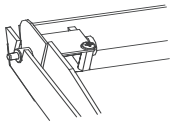


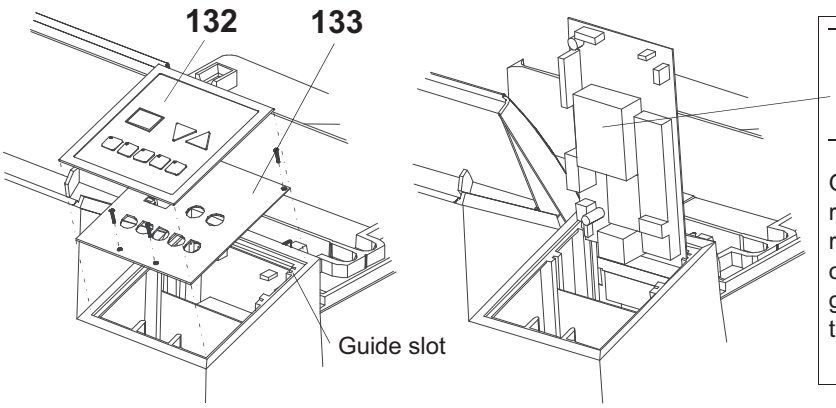
Standard roller racks

Pos.	Order No.	Description:
		Standard Processor
-	1170-0-0300	Roller rack, developer
-	1170-0-0400	Roller rack, fixer
-	1170-0-0600	Roller rack, dryer
		Mammography Processor
-	1171-0-0600	Roller rack, dryer
		Graphic Arts Processor
-	1172-0-0300	Roller rack, developer
-	1172-0-0600	Roller rack, dryer
100	0170-0-0301	Dryer side plate left w. shafts
	1170-0-0301	Side plate, dev. (right)
	0170-0-0401	Dryer side plate left w. shafts (left)
	1170-0-0401	Side plate fix. (right)
102	1140-0-3800	Guide bar straight, short
103	1140-0-4500	Guide bar with nose
104	1140-0-3700	Guide bar, curved
105	1170-0-0304	Flat spring 55
106	3079-8-5013	Screw M4x10, A4
107	3009-3-4023	Hexagon nut M4, A4
108	1140-0-0301	PU-roller 35 ground
109	1170-0-0310	Drive shaft rack
110	1101-0-0302	Gear t = 16, D-hole
111	1101-0-0304	Gear t = 32, round hole
112	1101-0-0303	Gear t = 32, D-hole
113	1170-0-0302	Worm wheel
114	1101-0-0305	Bearing bush
115	1101-0-0317	Bearing bush, black
116	2014-0-0001	Circlip
117	0170-0-0601	Dryer side plate left w. shafts
	1170-0-0602	Dryer side plate right
119	1140-0-0302	Rubber roller 35
120	1140-0-0605	Air jet (35)
121	1170-0-0604	Dryer plate, large
122	1170-0-0603	Dryer plate, small
123	1170-0-0303	Flat spring 35



The light protection cover can be removed. This is necessary to gain access to the film detection switches and the developer level switch. To remove it, pull off the blind (131) on the right side (!) of the cover and then pull the indexing bolt (130) from the support toward the inside. The cover can now be removed to the top. Remark: The left indexing bolt remains completely installed.





Attention!
The heat sink is not earthed!

Once the operating panel PCB has been removed, the control unit can be removed. Please do not lift the control unit out further than shown in the illustration. A guide on the top edge allows to position the control unit for service purposes.

Pos.	Order No.	Description:
130	1160-0-3103	Indexing bolt
131	1160-0-3106	Blind for light protection cover
132	2011-0-0137	Control panel foil
-	2011-0-0139	Operating membrane, 2 pump version
133	0160-9-1200	Control panel

Tips and Tricks

Removal of control PCB

To reach the screws of the control PCB, remove the film covering the buttons by approx 20 mm on the top and bottom edges (lift it, see illustration top left).

Stop start-cycle

The start-cycle (after switching the machine on) can be manually interrupted. To stop start-cycle, press both arrow-buttons (2+3) simultaneously. The start-cycle may only be interrupted for service purposes.

Display of machine information

When during the start-up cycle one of the arrow-buttons is pressed then various machine information will be displayed.

Arrow button “Up”:

The software version is displayed as long as you press the button.

Arrow button “Down”:

The number of film cycles is displayed as long as you press the button. Not the decimal point. Since the display has two digits only, the value needs to be converted:

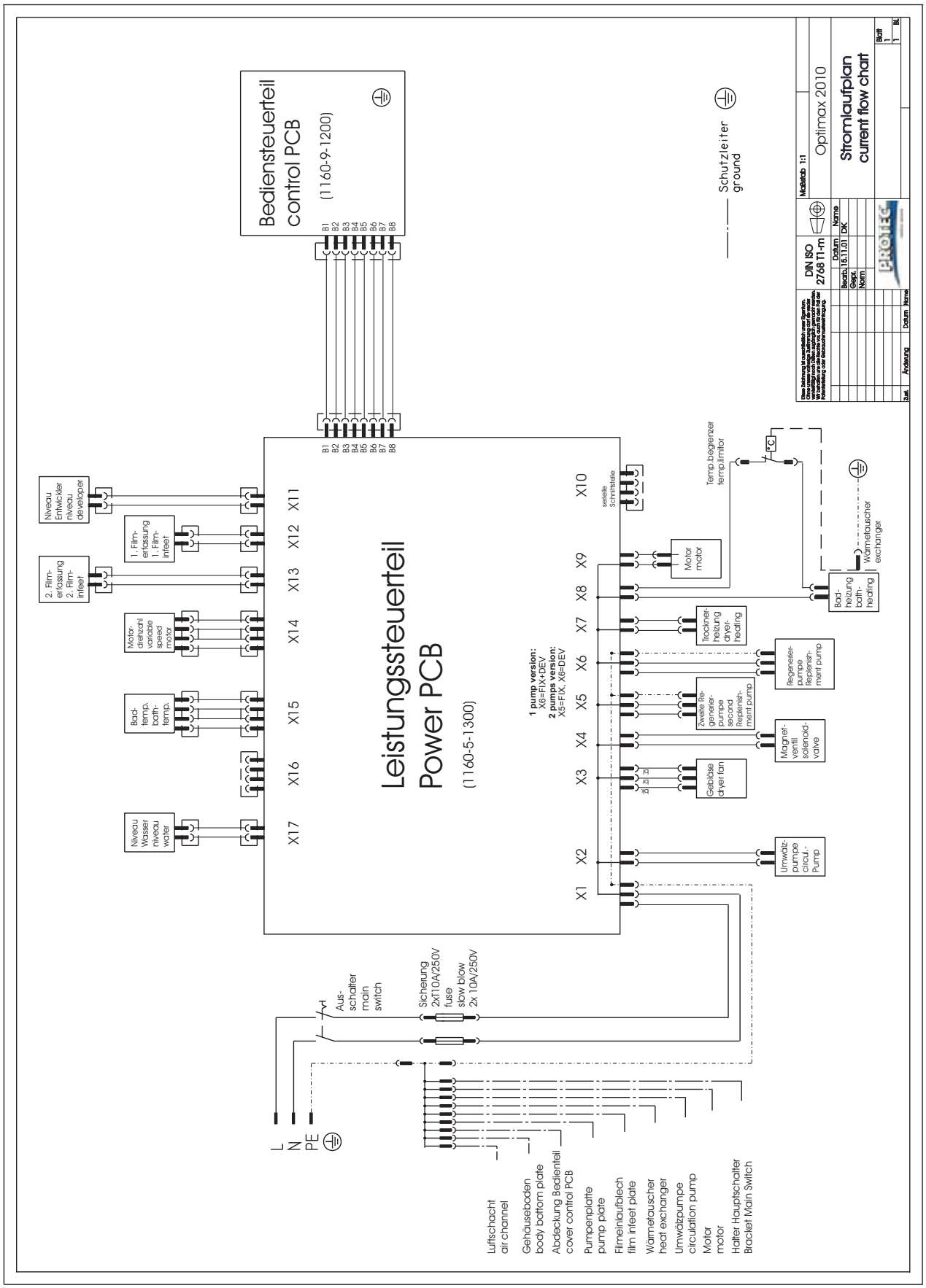
XX : value x 10 = number of films

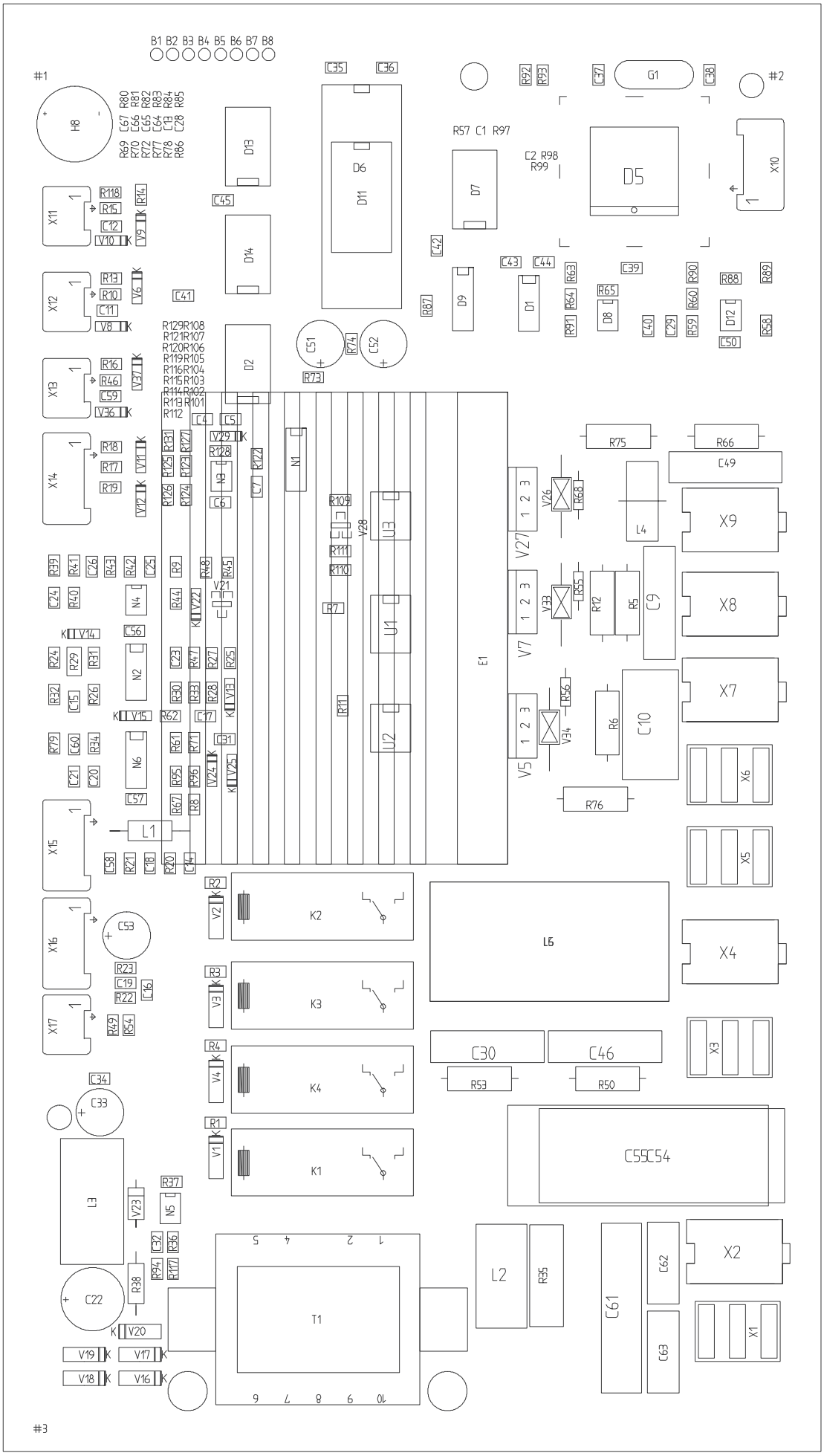
XX. : value x 100 = number of films

X.X : value x 1,000 = number of films

X.X. : value x 10,000= number of films

9.9. : more than 990,000 films


Bedientеuerteil
control PCB
(1160-9-1200)
Leistungssteuerteil
Power PCB
(1160-5-1300)
Schutzleiter
ground
Optimax 2010
Stromlaufplan
current flow chart
DIN ISO 2768 T1-m
Maßstab 1:1
1 pump version:
X6=FIX-DEV
2 pumps version:
X5=FIX, X6=DEV
Niveau Entwickler
niveau developer
2. Film-erfassung
2. Film-infeed
1. Film-erfassung
1. Film-infeed
Motor-drehzahl
variable speed motor
Bad-temp.
bath-temp.
Niveau Wasser
niveau water
Motor
motor
Trockner-heizung
dryer-heating
Zweite Re-generier-pumpe
second Replenish-ment pump
Gebläse
dryer fan
Magnet-ventil
solenoid-valve
Umwälz-pumpe
circul.-Pump
Regenerier-pumpe
Replenish-ment pump
Bad-heizung
bath-heating
Wärmetauscher
exchanger
Temp.begrenzer
temp.limitor
Aus-schalter
main switch
Sicherung
2xT10A/250V
fuse
slow blow
2x 10A/250V
L
N
PE
Luftschacht
air channel
Gehäuseboden
body bottom plate
Abdeckung Bedienteil
cover control PCB
Pumpenplatte
pump plate
Filmeinlaufblech
film infeed plate
Wärmetauscher
heat exchanger
Umwälzpumpe
circulation pump
Motor
motor
Halter Hauptschalter
Bracket Main Switch


B1 B2 B3 B4 B5 B6 B7 B8
#1
#2
#3
H8
G1
D5
D6
D11
D7
D13
D14
D2
D9
D1
D8
D12
X1
X2
X3
X4
X5
X6
X7
X8
X9
X10
X11
X12
X13
X14
X15
X16
X17
L1
L2
L3
L4
L5
L6
E1
T1
K1
K2
K3
K4
C55C54
C30
C46
C61
C62
C63
R53
R50
R76
R75
R66
C49
C9
C10
V5
V7
V27
U1
U2
U3
N1
N2
N3
N4
N5
N6
V1
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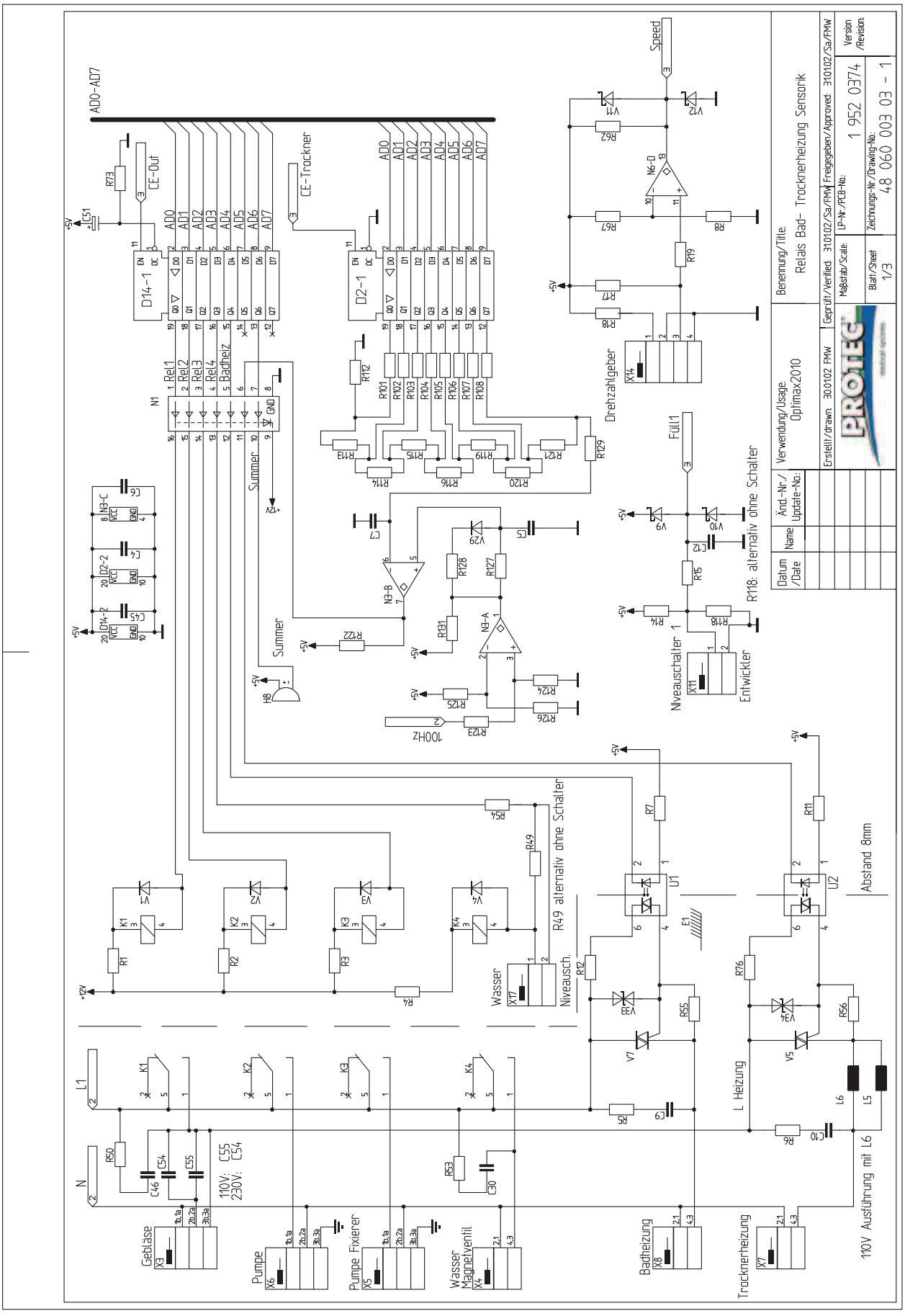
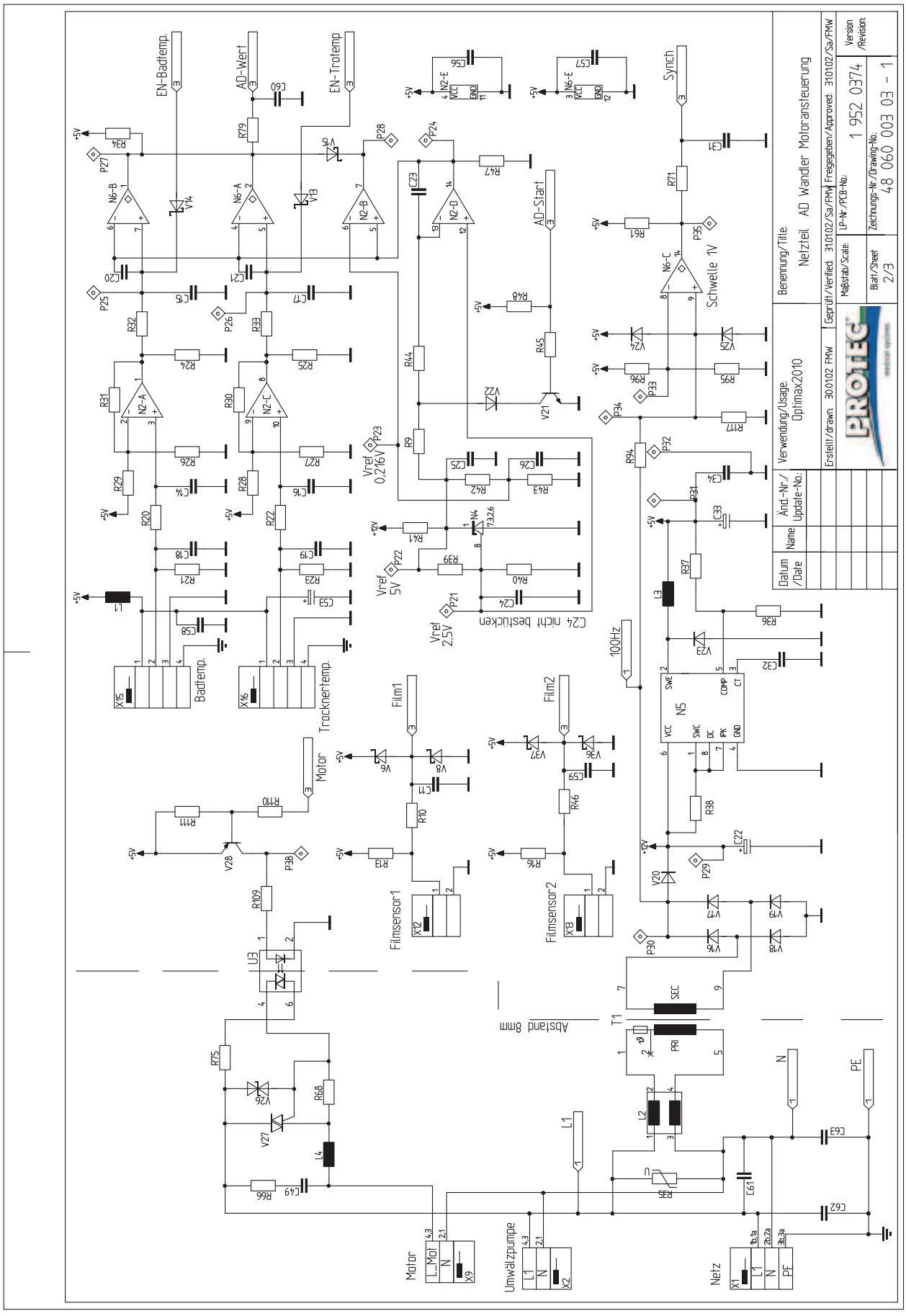
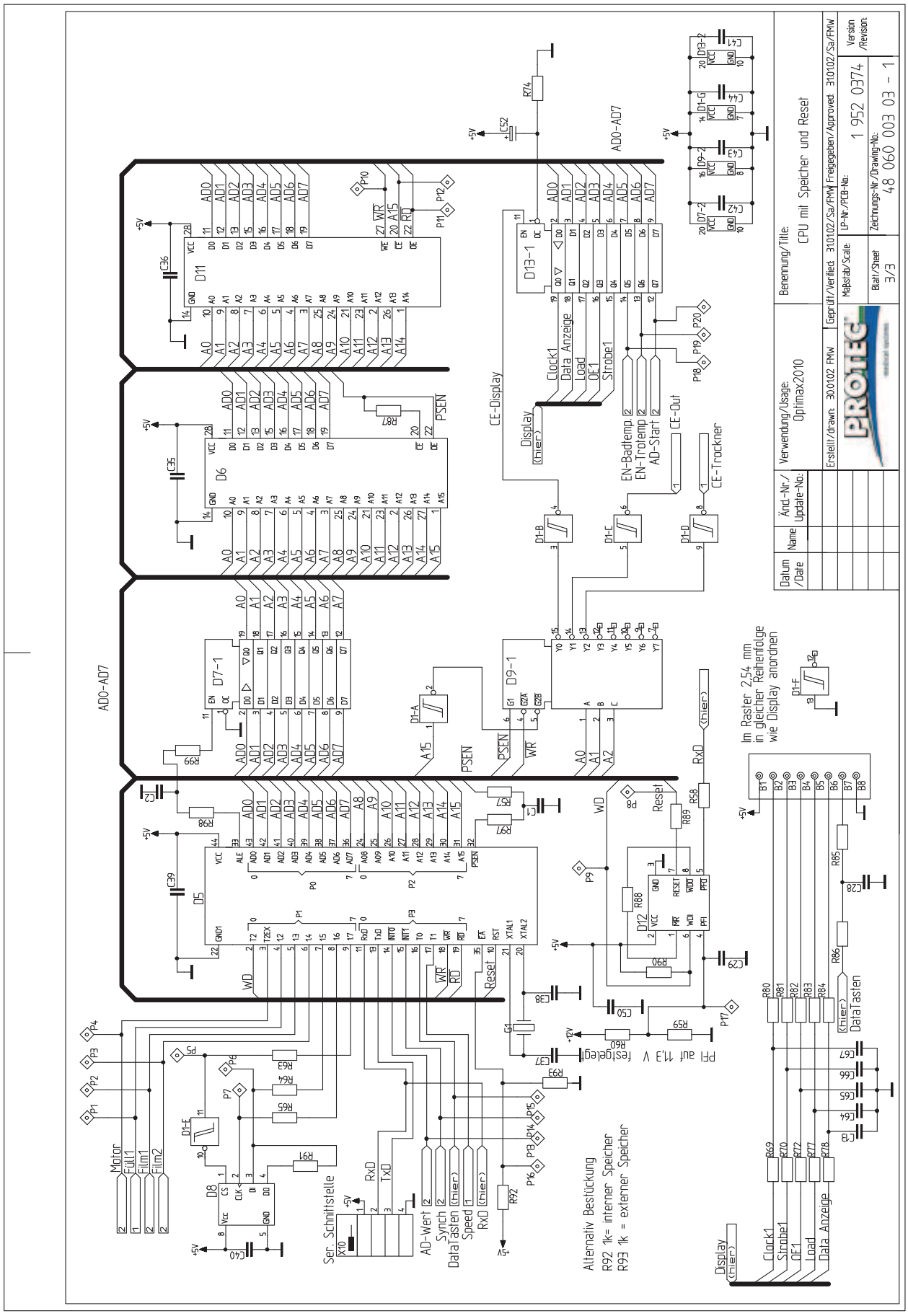
V3
V4
V16
V17
V18
V19
V20
C22
C33
C34
C51
C52
C53


Benennung/Title:
Relais Bad- Trocknerheizung Sensorik
Verwendung/Usage:
Optimax2010
Erstellt/drawn: 30.0102 FMw
Geprüft/Verified: 310102/Sa/FMW
Freigegeben/Approved: 310102/Sa/FMW
Maßstab/Scale:
Blatt/Sheet 1/3
LP-Nr./PCB-No: 1 952 0374
Zeichnungs-Nr./Drawing-No: 48 060 003 03 - 1
Version /Revision
Datum /Date
Name
Änd.-Nr./ Update-No.:
AD0-AD7
CE-Out
CE-Trockner
Speed
Drehzahlgeber
Summer
Badheiz
Rel1
Rel2
Rel3
Rel4
D14-1
D2-1
N1
Full1
Niveauschalter 1
Entwickler
R118: alternativ ohne Schalter
R49 alternativ ohne Schalter
Wasser
Niveausch.
Absand 8mm
L1
N
L Heizung
110V: C55
230V: C54
110V Ausführung mit L6
Gebläse
Pumpe
Pumpe Fixierer
Wasser Magnetventil
Badheizung
Trocknerheizung


Benennung/Title:
Netzteil AD Wandler Motoransteuerung
Verwendung/Usage:
Optimax2010
Erstellt/drawn: 300102 FMW
Geprüft/Verified: 310102/Sa/FMW
Freigegeben/Approved: 310102/Sa/FMW
LP-Nr/PCB-No.: 1 952 0374
Maßstab/Scale:
Blatt/Sheet 2/3
Zeichnungs-Nr./Drawing-No.: 48 060 003 03 - 1
Version /Revision:
Änd.-Nr./ Update-No.:
Name
Datum /Date
EN-Badtemp.
AD-Wert
EN-Trotemp
Synch
AD-Start
Schwelle 1V
Vref 0,216V
Vref 5V
Vref 2,5V
C24 nicht bestücken
Badtemp.
Trocknertemp.
Film1
Film2
Motor
Filmsensor1
Filmsensor2
100Hz
Abstand 8mm
Motor
Umwälzpumpe
Netz
PE
N
L1
L2
L3
L4


Benennung/Title:
CPU mit Speicher und Reset
Verwendung/Usage:
Optimax2010
Ersteller/drawn: 300102 FMW
Geprüft/Verified: 310102/Sa/FMW
Freigegeben/Approved: 310102/Sa/FMW
Maßstab/Scale:
Blatt/Sheet 3/3
LP-Nr./PCB-No: 1 952 0374
Zeichnungs-Nr./Drawing-No: 48 060 003 03 - 1
Version /Revision
Datum /Date
Name
Änd.-Nr./ Update-No.:
AD0-AD7
CE-Display
Display (hier)
Clock1
Data Anzeige
Load
OE1
Strobe1
EN-Badtemp
EN-Trotemp
AD-Start
CE-Out
CE-Trockner
PSEN
WR
RD
RxD
TxD
Reset
WD
Im Raster 2,54 mm in gleicher Reihenfolge wie Display anordnen
Motor
Full1
Film1
Film2
Ser. Schnittstelle
AD-Wert
Synch
DataTasten
Speed
Alternativ Bestückung
R92 1k= interner Speicher
R93 1k = externer Speicher
PFI auf 11,3 V festgelegt
DataTasten

Differences between OPTIMAX 2010 Standard (1160-1-0000) and OPTIMAX 2010 with two pumps (1160-1-2000)

1. Control panel

① Display working parameters

② Arrow button “Up” = increase parameter value

③ Arrow button “down” = decrease parameter value

Mode Buttons

④ Processing time in minutes

⑤ Developer temperature in °C

⑥ Dryer output in %

⑦ Replenishment time developer

⑧ Replenishment time fixer

2. Replenishment time

The replenishment function and adjustment of the replenishment time are identical with the standard version.

3. Spare Parts List

1. In the service manual page 42, pos. 20: replenishment pump with bellows: **0202-5-0002 (pos. 20b)**.
2. EPROM: 1160-0-0001

Order No. 1163 - X - Y000

X:	1	50 Hz	Y:	0	Version with 1 pump
	2	60 Hz		2	Version with 2 pumps

The film developer OPTIMAX®2010 has been extended by a further unit version.

Introduction

Processing time and developer temperature of the OPTIMAX®2010 NDT processor have been adjusted to the requirements of NDT-films. This results in the following modifications compared with the OPTIMAX®2010 standard version.

General

To maintain constantly good film quality the NDT-roller (upper roller of last roller pair of developer rack) must be replaced every 3 - 6 months, depending on the quantity of films processed, the chemicals and films used. 1 spare roller is supplied with the unit. This roller must be considered a wear part and is excluded from the guarantee.

Important!

Please take care that the film does not carry any dirt into the processor.

Technical Specifications (compare page 8)

Processing capacity:	129 films 24x30 cm (crosswise), at lowest processing time
Process time:	1.5 - 10 min
Linear speed:	8.4 - 56.0 cm/min
Developer time:	25-164 s
Developer temperature	26 - 37 °C / 78 - 99 °F

Processing time (compare page 17)

Processing time from 1.5 - 10.0 min

Processing and developer time relation		
Processing time (min)	Developer time (s)	Infeed speed (cm/min)
1,5	25	56
1,7	28	49
2,0	33	42
2,3	38	37
2,5	41	34
2,7	44	31
3,0	49	28
5,0	82	17
8,0	131	11
10,0	164	9

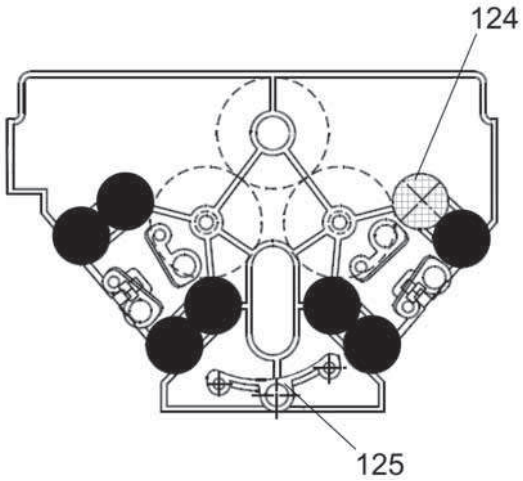
Developer temperature (compare page 18)

Adjustable 26 - 37 °C / 78 - 99 °F)

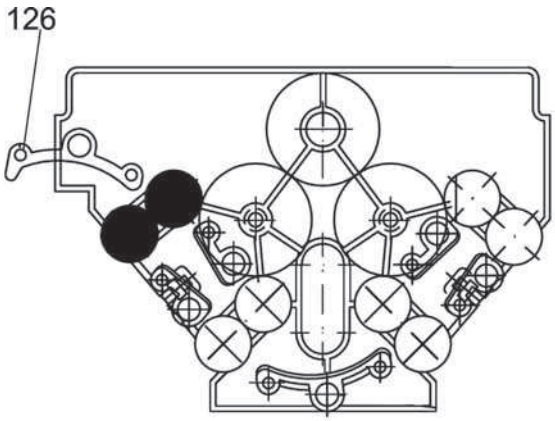
Spare parts list (compare page 41)

Pos.	Order No.	Description:
25	0163-5-1300	Power output section OPTIMAX 2010 NDT 230V
-	0163-6-1300	Power output section OPTIMAX 2010 NDT 110V
-	1163-0-0300	Roller rack developer NDT
-	1163-0-0400	Roller rack fixer NDT
-	1163-0-0600	Roller rack water/dryer NDT
124	1163-0-0307	Roller NDT (output roller top of developer rack)
125	1161-0-3900	Guide rail 2, bent without ribs
126	1161-0-4000	Guide rail 2, bent with nose, without ribs
127	1101-0-0317	Bearing bush, large, black

Developer (red)



Fixer (blue)



125 Guide rail 2, bent without ribs
1101-0-3900

126 Guide rail 2, bent with nose, without ribs
1101-0-4000

127 Bearing bush, large, black
1101-0-0317

124 Roller NDT
1163-0-0307

Water/dryer (beige)